WILDFIRE AT THE WILDLAND/URBAN INTERFACE: A SURVEY OF MESO LEVEL DECISION MAKERS AND THEIR SUPPORT OF WILDFIRE HAZARD MITIGATION MEASURES

By

STEVE COOK

DISSERTATION PRESENTED TO THE GRADUATE SCHOOL
OF THE UNIVERSITY OF FLORIDA IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY

UNIVERSITY OF FLORIDA

1995

This dissertation is dedicated to my dad who instilled in me the belief that my success is in my own hands and that no one is better than I am--just different. Following these two basic tenets, I have achieved more than my origins would have suggested.

ACKNOWLEDGEMENTS

I would have never made it without the positive feedback from students over the past four years as I struggled to complete this document while simultaneously teaching. I must also thank my advisor, César Caviedes for support above and beyond what any student has a right to expect. And of course my wife, Terri Cook who has tolerated it all.

TABLE OF CONTENTS

page

ACKNOWLEDGEMENTS..... iii

ABSTRACT..... vi

CHAPTERS

1 INTRODUCTION..... 1

Wildfire as a Natural Hazard..... 1
Impact of Wildfires on Human Settlement Patterns..... 4
The Current State of the Art..... 10
Materials and Methods..... 13
Who Said What..... 15
Rummaging in the Garbage Can..... 16
What Does it all Mean?..... 16
Endnotes..... 17

2 LITERATURE REVIEW..... 18

Environmental Hazards..... 18
Wildfire at the Wildland/Urban Interface..... 27
Current Situation..... 34
Endnotes..... 45

3 MATERIALS AND METHODS..... 47

Overview of Research..... 47
Specific Objectives..... 59

4 DIFFERENCES BETWEEN THREE LEVELS OF GOVERNMENT..... 64

Are They Unique Individuals?..... 64
Testing for Commonility Between Federal, State, and County Officials..... 86
Searching for Individual Differences..... 89
They are Different--But Not Always as Assumed. 95
Can They Ever Get Along?..... 98

5 THE GARBAGE CAN THEORY AND WILDFIRES..... 100

Why Some Counties Adopt Plans and Others Don't 100
Is There a Problem?..... 101
Whose Problem Is It Anyway?..... 103
Some See Bigger Problems than Others..... 108
Are There Solutions?..... 111
Solution Recognition Varies..... 124
Are There People Available to Address the Issue?..... 125
Was There a Decision Opportunity..... 129
Everyone Had the Same Decision Opportunity.... 131
The "Garbage Can Model" and its Application to This Study..... 132

6 FINAL CONCLUSIONS..... 134

Federal and State versus County Decision Makers..... 134
Decision Makers in Counties with Plans versus Those from Counties Without Plans..... 139
A Final Note..... 141

APPENDICES

1 SURVEY QUESTIONNAIRE..... 143

2 QUESTIONNAIRE RESPONSE COMPILATION AND ANALYSIS..... 165

3 LIST OF SOME WILDLAND/URBAN FIRE PUBLICATIONS. 249

REFERENCES..... 255

BIOGRAPHICAL SKETCH..... 268

Abstract of Dissertation Presentet to the Graduate School of the University of Florida in Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy

WILDFIRE AT THE WILDLAND/URBAN INTERFACE:
A SURVEY OF MESO LEVEL DECISION MAKERS AND THEIR SUPPORT OF WILDFIRE HAZARD MITIGATION MEASURES

By

Steve Cook

May 1995

Chairman: César Caviedes
Major Department: Geography

The natural hazard of wildfire at the wildland/urban interface is investigated in this dissertation. This research proposes that lack of action on this hazard is due to poor coordination and understanding among the three levels of government officials--federal, state and county, who administer the areas involved. To investigate this issue 369 individuals in 37 counties in 12 states were questioned at length on all aspects of the problem. Of particular interest was a comparison of answers from the three levels of administration. It was established that federal and state officials tend to be similar in background, hold similar beliefs, and exhibit similar behavior. County officials are more uniform than either of their peer groups in the same categories. However, the individuals working at the county level are very

different from individuals at the other two levels of government.

To investigate why counties with similar wildfire histories differ in their responses to the problem, the Kingdon "Garbage Can" model of decision making was applied to responses from individuals from the involved counties. It was found that the model performed exceedingly well, demonstrating that officials in counties that have not developed wildfire hazard mitigation plans are less likely to recognize a problem; less likely to recognize solutions; and less likely to have people available to work on the issue than officials from counties that have developed wildfire hazard mitigation plans. Also it was found that a "decision opportunity" (defined as having a wildfire(s) that caused problems in the county within the last ten years) had occurred equally for counties with and without plans in place.

CHAPTER 1
INTRODUCTION

Wildfire as a Natural Hazard

Any list of natural hazards is going to be subjective, according to the author's experience, biases, and research goals. I have yet to see a compilation of natural hazards that includes wildfire. What are natural hazards? Addressing this question, Palm (1990, p. 3) states:

> Natural . . . hazards are those [hazards] triggered by climatic and geological variability, which is at least partly beyond the control of human activity.

and then she adds:

> [This] small set of natural hazards is related to the atmosphere, the surface of the earth, and water including severe winter, storms, tornadoes, hurricanes, and other atmospheric hazards, earthquakes, volcanic activity, expansive soils, landslides and mass movements, subsidence, coastal processes, drought, groundwater contamination or depletion and floods.

finally she concludes:

> We may consider the environment as hazardous only when some aspect of the environment threatens the well-being of individuals or society. It is only when the inter-action of the environment with human activity threatens to cause loss of life or property, or disruptions of individual or community routines or organizational structure that we see the environment as hazardous.

Palm then proceeds to write an entire book on natural hazards, carefully categorizing many hazards and explaining each, mentioning wildfire only in an off-hand manner. Reviewing this book[1] it is clearly evident that wildfire, whether natural wildfire occurring in wildland settings or wildfire that involves human-built structures has not been considered as a natural hazard.

Does wildfire fit Palm's criteria? Is wildfire a "Natural . . . hazard triggered by climatic and geological variability . . . ?" Wildfires have a climatic trigger as they occur generally under drought conditions and are frequently sparked directly by lightening. Is wildfire "at least partly beyond the control of human activity?" The best efforts of the United States Department of Agriculture, Forest Service; The United States Department of the Interior, Bureau of Land Management; and many state forestry agencies over the last eighty years have been unable to control wildfires, or to reduce the acreage burned. Fires have been reduced in number, but those that have burned have been larger. Yes, wildfires are "beyond the control of human activity."

Certainly, according to Palm's first definition, wildfire should be included. Likewise, it is not necessary to stretch either of her other definitions to include wildfire. Why then has wildfire not been included in natural hazard studies done by geographers? Perhaps because wildfire has been studied by investigators within forestry and natural resource

departments. They have been typically considered from a practical rather than a theoretical perspective. The majority of the writing on wildfires has been couched within forestry management terms. Funds have also been very limited for research and counter-measures when this natural hazard is compared to earthquakes, hurricanes, or floods.

Like earthquakes along known faults, the probability of a wildfire occurring increases with the passage of time. However, unlike earthquakes, it is possible for a trained observer to visually identify the potential wildfire hazard of an area and pass that knowledge to homeowners in the involved area. Like floods, wildfires are associated with climatic conditions, but wildfire's impact can be more easily reduced by land management practices. There are other comparisons and contrasts that can be made between wildfire and other natural hazards, but the point is that wildfire is a natural hazard that can perhaps be mitigated more easily than some of the "traditional" natural hazards, while still allowing human activity in the hazard zone. By using mitigative measures when designing and constructing subdivisions along with careful homesite selection, design, and construction techniques, and coupling these with an awareness of the hazard by the property owner, the hazard can be reduced significantly. This research investigates the people involved in the implementation or non-implementation of wildfire mitigation

measures in counties across the United States where serious wildfire threats exist in the wildland/urban interface.

Impact of Wildfires on Human Settlement Patterns

By the criteria used in this research, the wildland/urban interface will be defined as an area which still retains most of its natural character, including vegetation, but which also contains human-built structures. The key to this issue is that the area still retains most of its natural character.

As with many aspects of the natural hazard of wildfire at the wildland/urban interface, there is not even agreement among professionals what the area involved should be called. Some avoid using "interface," suggesting that "wildland/urban intermix" is more appropriate since there is seldom a distinct interface. They say that the boundary between wildland and non-wildland is fuzzy.[2] It is also true that the character of the human-built structures varies widely from a travel trailer parked in the brush to be used only during the fall as a hunting base, to full-blown subdivisions and ski resorts.

The humans involved vary just as widely, from rural folks who grew up in the woods and are cognizant of the danger posed by wildfire and who reduce it's potential simply as part of life, to subdivision dwellers who have moved from the city, sometimes from a different state and/or climatic zone, and

have no knowledge of the wildfire susceptibility of the natural vegetation that surrounds their new home in the woods.

For the purpose of this research, the criteria used to identify areas with a high wildfire potential were left up to the professional judgements of the land managers in the states considered in the study. Some surveyed counties have a high number of individual rural homes while in others there are cities expanding into areas with high wildfire potential. The commonality of all of them is the wildfire potential, not the structure type or resident's demographics.

Wildland/Urban Interface Fires

Over the past eighty years, the number of wildfire in the United States has been reduced to the extent that technology and funding have allowed. During the same time, the number of structures that have been built in, and adjacent to, wildland areas that have historically been subject to wildfire has increased dramatically, resulting in even more aggressive fire suppression activities. The result is a buildup of forest floor fuels and altered species composition creating an ecological situation conducive to severe conflagrations.

The list of counties across the country that have experienced destructive fires in the wildland/urban interface in the past few years is lengthy (Table 1-1). Moreover, the number of homes destroyed and acres of wildland burned increases every year.

Table 1-1
Damaging Recent WUI Wildfires

Location	Damage	Year
FL-Flagler County	99 homes	1985
Oregon (several)	22 homes 2 lives	1987
CO-Boulder County	44 homes	1989
MI-Crawford County	86 homes	1990
CA-Santa Barbara County	450 homes	1990
OTHER COUNTIES WITH RECENT FIRES		
WA-Okanogan County		1990
WA-Spokane County		1990
TX-Shackleford County		1988
OR-Deschutes County		1989
UT-Wasatch County		1988
CA-Oakland		1991

Home Construction and Forest Fuels are Increasing Together

The problem has worsened even as efforts to reduce the hazard have increased. Many symposia and conferences centered on this problem have been held[3] and dozens of publications addressing inter-agency cooperation, fire fighter training, subdivision design, and techniques property owners can use to reduce the hazard near structures have been produced and disseminated. Yet in many high-risk wildland/urban counties, the hazard has not been addressed at all. There are several possible reasons to explain the evident lack of administrative action:

1. the techniques proposed to address the problem are not appropriate;

2. involved agencies are failing to cooperate among themselves;

3. decisions are being made without involving the entire spectrum of affected individuals, businesses and agencies;

4. the problem is not considered a high priority by individuals and government entities with other pressing concerns;

5. money availability.

However, there are some counties with high wildfire hazard potential where wildfire mitigation measures are in place and appear to be functioning, thus reducing the incompatibility of structures and wildfire-adapted ecosystems. In these counties there seems to have been a convergence of opinions that wildfire at the wildland/urban interface is a problem that needed to be addressed. If factors that facilitate the adoption of mitigation measures can be identified, perhaps obstacles to their adoption in high-hazard counties without mitigation measures could be removed.

Why Investigate Meso Level Decision Makers Anyway?

After Sorensen (1983) succinctly summarized the inconclusiveness of past perception research, one is inclined to agree with him that further research into individual perceptions of natural hazards is likely to produce more conflicting results. It has become evident after much research into individual perception of natural hazards, that individuals may not recognize a hazard; may not believe that the hazard is present at all; and even if they do recognize it, they may not find it

to be an important enough factor in their lives to address it. But perhaps the most important finding of hazards research (although inadvertent) is that the actual response of an individual to a hazardous event may bear little resemblance to what that individual had indicated his response would be.

Initiation of wildfire mitigation measures does not lie at this micro (individual) level. At the broader macro level, federal and state governments have tried various approaches to deal with the problem, but with limited success. Increased adoption of wildfire hazard mitigation measures does not seem to rest with the macro level either. This restricts the question to the decision makers at the meso level (community or county). The weak existing link between macro level programs and micro level recognition of wildfire hazard may, then, be attributable to these meso level people. No research has investigated who they are and why they act as they do. Yet their involvement is crucial in channeling macro level programs to micro level consumers.

Identification of Official Decision Makers

Investigations have shown that there is considerable interaction between federal, state and county decision makers on land management issues, due to the fact that many wildfire prone counties include large acreage of federal and/or state land within their boundaries, often in highly fragmented parcels. Public land fire management can not be separated from adjoining private land. Thus any research into meso

level decision makers must include the federal and state managers of this public land.

Within any county or fire district exists a complex mix of property ownerships, including private as well as public land. This public land is not an amorphous entity, but is divided into many individual parcels, managed variously by one of several federal, state or local entities having very divergent management goals and objectives.

Even if (and this is a big "if") all public land managers agree upon mitigation strategies, seldom do private property owners adopt mitigation measures without being assisted, encouraged or forced by government agencies (Abt et al. 1990; Adams 1990). If all landowners, both public and private are not involved in the development and execution of these strategies, the effectiveness will be greatly reduced. The focus of this research therefore is on federal, state, and county decision makers with local knowledge of the hazard, or those people with authority to act upon staff recommendations.

Goals of this Research

The first goal of this research was to identify the differences between officials working at different levels of government. It was hypothesized that federal officials would be more uniform in their beliefs, perceptions, and knowledge of wildfire than their state counterparts who in turn would be more uniform on the above criteria than county officials. Furthermore it was hypothesized that federal and state

officials would be more similar than their county peers on similar questions of land management as it related to wildfire. Thirdly, it was hypothesized that federal officials would be more narrowly defined demographically than their state peers who in turn would be more narrowly defined than county officials. If these three hypothesis are true, it will be easier to understand the differences between the relative positions taken by the three levels of officials when the issue of wildfire arises.

An additional goal of this research was to test the Kingdon (1984) decision making model. In brief, the model states that for a governmental decision to be made four streams of input must come together in a "garbage can." They include identified problems; solutions to these problems; people available to address the problems; and finally a decision opportunity. The hypothesis was that counties that have developed Wildfire Hazard Mitigation Programs (WHMPs) would have fulfilled these four criteria, while similar counties with similar fire hazards but without WHMPs would not have the four streams "flowing."

The Current State of the Art

Chapter 2 outlines the evolution of research beginning with Gilbert White, the initiator of natural hazards research, through technological hazards and risk. Governmental policy making in general was investigated, with special emphasis on

the "Garbage Can Model" of decision making. Finally an extensive review of the hazard of wildfire at the wildland/ urban interface, spatially and temporally is included.

Historical Review

For many years, natural hazards research in geography centered upon individual perception of and response to a hazard. But after many years and innumerable research projects this line of investigation died out, because it obviously was leading nowhere. Individuals have difficulty explaining how they would respond to a hazard, but they feel compelled to provide an answer when asked for a response to a hypothetical situation. Since these hypothetical responses were simply guesses, they had little relationship to the individuals response to an actual natural hazard event.

More recently technological hazards have been a more popular research arena. Individual perceptions were just as hard to nail down in this arena as was the case with natural hazards.

The study of technological hazards evolved into issues of risk, in the context of technological hazards. Risk literature is rife with statements about "subjective analysis" of individuals. A new group of researchers, funded by government and industry, took the approach that things would be OK if citizens would just listen to scientific logic. This approach tended to polarize the issue of technological hazards even more.

Governmental decision making, especially viewed through the eyepiece of Kingdon's (1984) "Garbage Can Model" is reviewed extensively. Kingdon took a rather fuzzy theoretical idea and applied it qualitatively to decision making within the federal government. He maintained that for a decision to be made, four streams have to flow together. Alesch and Petak (1988) applied this model to the cities of Long Beach and Los Angeles in reference to earthquake hazards.

Most closely related to this study is research conducted by Mittler (1988) who reviewed decision making related to hurricane mitigation measures along the Atlantic and Gulf coasts.

Wildfire at the Wildland/Urban Interface as a Hazard

Wildfire has been a part of the natural systems of North America at least since the last ice age. However, it only became a serious hazard for modern man recently as population pressures pushed people into fire-prone areas.

In the United States, all levels of government have been involved, however not consistently, with some public land managers aggressively pursuing the problem and others essentially ignoring it entirely.

Currently, there is much talk, and some action, although the impetus for action in some areas and not in others is not always obvious. This realm might be fertile ground for research into "gatekeepers," as often it appears that a single individual may be the impetus. But there is a trend toward

more and more cooperation among various entities, and more communication at all levels.

What may be bringing these disparate groups together in an attempt to deal with the hazard is the extreme cost in both manpower and resources. Nobody has the money to continue the status quo. As with many other problems that are addressed by government entities, there is nothing quite as urgent as economic necessity.

Materials and Methods

Chapter 3 dwells at length upon the hypotheses and assumptions of this research and the objectives used to test these hypotheses and assumptions. The following is a brief overview only; for in-depth coverage of objectives and assumptions see Chapter 3.

This research addressed two questions:

1. What are "the motivations, perceptions and values within and between [government officials at the federal, state and county levels] involved in the wildland/urban interface" and "how [do] these people influence the adoption of fire-safe ideas and practices?" (from Davis 1990) and,

2. Will the "garbage can model" enunciated by Cohen et al. (1972), as adapted by Kingdon (1984), and used quantitatively by Alesch and Petak (1988) and Mittler (1988) work in a narrowly defined study such as this one?

The procedures developed by Rossi et al. (1982) were followed. The focus, however, has been narrowed to the single issue of wildfire at the wildland/urban interface. There has

been no comprehensive data collection on the individuals involved with this issue at the "meso level." Furthermore, responses of elected officials in the counties involved were analyzed, in a manner similar to that of Mittler's study of state elected officials, in an attempt to provide a basis for prediction of where wildfire hazard mitigation measures are likely to be adopted and where that adoption is unlikely.

Testing Hypothesis and Assumptions

Objective 1. To search for consistency of responses among federal, state, and county officials.

The assumption is that federal decision makers will exhibit uniformity in their responses with state officials having less uniformity and county respondents mustering the least.

Objective 2. To identify whether federal and state officials respond similarly to each other but differently than county officials.

It is assumed that federal and state responses will be more closely associated than either federal and county or state and county.

Objective 3. To investigate the depth and breadth of individual federal, state and county decision makers involvement in and attitude toward adoption of wildfire hazard mitigation measures.

The assumption is that individual federal decision makers have more extensive experience, are the most knowledgeable, and have the greatest interest in the adoption of mitigation measures, with less knowledge and interest among state decision makers, and, even less at the county level.

Objective 4. To test the Kingdon model utilizing government decision makers attitudes and actions toward wildfire at the wildland/urban interface.

The assumption is that the Kingdon "Garbage Can" model of decision making will explain why some counties in the

study have adopted wildfire hazard mitigation measures while others with similar hazards have not.

Research Instrument

The means of gathering information for analysis to prove the hypotheses was a mail survey questionnaire. Information was solicited from 543 individuals, including 339 county, 58 state, and 138 federal officials. Of this total, 369 (68%) were returned completed: 202 county (59.6%), 50 state (86.2%), and 117 federal (84.8%).

The survey questionnaire sought demographic information and also included questions probing the respondents knowledge of wildfire history in their jurisdiction, their understanding of the hazard, and how important they feel the hazard is when compared to other hazards. There are questions that ask them to speculate upon the future importance of the hazard in relation to other hazards. Their knowledge of past governmental action relating to the hazard, as well as their attitude toward potential courses of action to deal with the issue in the future was probed. Personal experience with the hazard was sought out, as well as personal training and education relating to the hazard.

Who Said What

Chapter 4 sorts out the questions in light of the first three objectives. Questions were analyzed individually and

then were aggregated in several ways to address the four objectives.

Rummaging in the Garbage Can

Chapter 5 is a thorough look at the questions that are appropriate for testing the various streams identified by Kingdon. The streams are isolated in light of the specific hazard of wildfire. There are several questions that directly shed light upon whether the requirements for each stream have been met in counties with active wildfire hazard mitigation plans and not met in counties with similar fire hazards but without a plan in place. The results are enlightening.

What Does it all Mean?

Finally, Chapter 6 ties it back together. How successful has this research been in identifying differences between the three groups? Are county respondents really less cohesive in their responses? Are they really different from their federal and state counterparts? Are they less educated, less knowledgeable, and show less concern for the hazard?

And what about Kingdon and his "Garbage Can" theory of decision making? Is this a reasonable model to use to define whether a county has a functioning wildfire hazard mitigation plan?

Endnotes

1. I do not wish to appear overly critical of Palm's book here, I am using her book as an example simply because it is the most recent book on natural hazards. She has generally included the same presentation of natural hazards as her predecessors, all of whom have ignored wildfire as a natural hazard. However, I do feel that Palm could have been more cognizant of increase in negative wildfire/human interactions during the last decade. In the 1950's and 1960's when much was written about natural hazards, wildfire at the wildland-/urban interface was not an issue.

2. Even though I have chosen to use a more complex definition of what constitutes the Wildland/Urban interface, I have considerable affinity for the simplicity of the definition used by Dan Bailey, a Fire Management Officer for the United States Forest Service in Missoula, Montana. Mr. Bailey suggests simply that the Wildland/ Urban interface is any place that flammable vegetation meets human structures. This definition allows the inclusion of the incredibly flammable juniperus (sp) that many suburban homeowners plant around their homes.

3. See especially Fischer and Arno, eds., Protecting People and Homes from Wildfire in the Interior West, but also see, California Department of Forestry & Fire Protection, et al., Fire Safe California Workshops; Texas Forest Service, Wildfire Strikes Home in Texas; USDA Forest Service, Proceedings, International Wildland Fire Conference; Florida Division of Forestry, Wildland/Urban Fire Protection Initiative; Washington State Department of Natural Resources, Statewide Wildfire Conference; Louisiana Department of Agriculture and Forestry, Wildfire Strikes Home in Louisiana. There have been many others at the state and local level, but except for Fischer and Arno, they have involved fire managers and emergency services personnel to the exclusion of county policy makers, homeowners, insurance companies, subdivision developers, and commercial property owners.

CHAPTER 2
LITERATURE REVIEW

Environmental Hazards

Natural Hazards

Natural hazards, as a legitimate field of study, was initiated by Gilbert White (1945). His studies of flooding and the perceptions of individuals of the floods, predominantly in the midwest (White 1961; 1964; 1958) were the first attempts to reconcile the problem of natural hazard increase due to human occupance of hazard zones. Later White and his disciples, Kates and Burton began what was to become an extended period of study of hazard perception (White 1974, 1984; Kates 1962; Burton and Kates 1974; Burton, Kates and White 1978). This research provided little information helpful toward the reduction of natural hazards as the results were ambiguous and not reproducible (Watts in Hewett 1983; Bertness 1986). In their latest work on the subject, Kates and Burton (1986) merely reviewed (and embellished) past research and accomplishments of White and his followers.

Presently natural hazards are commonly studied as "natural disasters"[1] by sociologists (Drabek 1986; Quarantelli 1987). There is also much ongoing research on the actual physical processes of natural hazards (Earthquake Engineering

Research Institute 1986). However, some sociologists, most notably Godschalk (1985a, 1985b; Godschalk et al. 1989) with his work on coastal zone management, have begun including mitigation strategies in their work.

Some of the current issues dealt with by the contemporary hazards research establishment include, technological hazards, risk and governmental policy making.

Technological Hazards

The majority of research money has been channeled away from natural hazards and natural disasters[2] into the field of technological hazards, with the more socially conscious researchers studying the negative impacts of technological hazardous events upon society. Research into the social impacts of technological hazards at Three Mile Island (Bartlett et al. 1983), Love Canal (Fowlkes and Miller 1988), Chernobyl (Hohenemser and Renn 1988) and Bhopal (Shrivastava 1987) have appeared, generally supporting the lay person's concern of technological hazards.

Risk

To counter what is considered "irrational" behavior and fear of technological hazards, government and industry funded studies of risk, and risk behavior treatises began appearing. It is very interesting that these risk analysis researchers apparently had never bothered to review the work that had been done by White, Kates and Burton much earlier, attempting to

explain human perceptions and relate that to human behavior connected to natural hazards. The risk analysis literature has many references to "subjective analysis" which is the irrational view of the layman of technological hazards compared to the "objective analysis" presented by the "professionals" and "scientists." Wildavsky (1988) is one of the more aggressive proponents of this logic, stating rather bluntly that technology has brought western societies the good life, and people should quit complaining about the tiny possibility of a hazardous event resulting from technological mishaps. Audet (1988) explains how insurance companies are essentially directing private industrial policy by selecting insurance risks that have "predictability" (p. 275).

Meanwhile other researchers were bypassing the objective reality v. subjective reality debate and were looking at what the roots of the differences were. Slovic et al. (1980) produced some of the best work, viewing the subject from the layman's as well as the professional's perspective. Diggs (1988) in a broad review of articles on the subject concluded (p. vii):

> At least four broad themes emerge from this collection of studies. Risk communicators must learn to 1) target, 2) research, 3) interact, and 4) specify. Not only should at-risk groups be targeted, but communication channels, education materials, timing, legislators, and other elements that can directly or indirectly influence the effectiveness of information flow and acceptance must also be identified. Risk communication should also be a reciprocal process of interaction between information disseminators, decision makers, and local people. Interaction often results in higher manag-

> er credibility, increased hazard salience, two way learning, and frequent revision of plans. Finally it is important to specify the program goals, rationale, physical features, and desired actions. Ambiguity results in exaggeration and/or inappropriate and unpredictable behavior. . . .

Governmental Policy Making

Much earlier, Eulau (1969) had cautioned "Science, then, is anything but 'value free'" (p. xii) in a fascinating study of what motivates local governments to respond to public stimuli.

What clearly emerges in a review of the studies is that there are essentially three groups of actors in any discussion of natural hazards. First, there are lay people, who may be extremely diverse demographically and politically, but who generally see risks and hazards as they bear upon themselves as individuals and upon the individuals around them. Secondly, there are the "experts" who generally represent the government and/or industry and who have as their agenda convincing the lay people that they (the experts) understand the risks and hazards better than anyone. Thirdly, there are the politicians, usually local, who see almost everything in terms of "how much does it cost" and usually respond to "a few, but intensely felt problems" (Eulau 1969, p. 287). Eulau's assessment of how the process works applies to many facets in the development of public policy, but seem particularly pertinent to understanding how local governments respond to "environmental challenges."

The Garbage Can Model

It seems almost as if the funky title was attached to this decidedly non-funky model simply to attract attention to it. It is exciting and stimulating to see the model progress from a rather fuzzy theoretical construct through three independent research applications that are each a little more practical and narrowly defined than the one before. The model is attractive for its simplicity and ease of application. It is also a pleasure to locate a model that is clearly defined and does not require a hundred little boxes interconnected in a multiplicity of directions. This model is for practical people conducting practical research.

The model begins with a "garbage can" which represents an issue that may or may not ever be addressed by the officials involved. Each issue has its own can. Different aspects of any particular issue may be tossed into the appropriate garbage can at any time. The model as refined by Alesch and Petak (1986) holds that officials will not address an issue unless four separate, complete streams of "garbage" flow into the can. These streams, include in no particular order, a problem, a solution, people to work on the problem, and some impetus to bring the issue to the forefront.

Refinement of the Garbage Can Model by Past Researchers

The term "Garbage Can Model" was coined by Cohen, March and Olsen (1972) in their study of how decisions were made in

a university administration. Kingdon (1984 p.90-91) quotes Cohen, et al.

> "As a choice opportunity (e.g., the selection of a dean) floats by in the organization (e.g., a university) various participants, each with their own resources, become involved. Various problems (e.g., maintaining scholarly quality, curriculum improvement, affirmative action) are introduced into the choice, and various solutions (e.g., inside candidates for a deanship, outside candidates, expanding the unit, abolishing the unit) may be considered. A choice opportunity thus is "a garbage can into which various kinds of problems and solutions are dumped by participants as they are generated. The mix of garbage in a single can depends on the mix of cans available, on the labels attached to the alternative cans, on what garbage is currently being produced and on the speed with which garbage is collected and removed from the scene."

Kingdon then goes on to explain his own interpretation of this model (page 93)

> The outcomes, then, are a function of the mix of garbage (problems, solutions, participants, and the participants' resources) in the can and how it is processed. Who is invited to or shows up for a meeting (i.e., who the participants are) affects the outcome dramatically. Which solutions are ready for airing and which problems are on people's minds are critical. the various streams are coupled in these choice contexts. When a given solution is proposed, it may be regarded by the participants as irrelevant to the problem and is thus discarded. Or even more likely, the participants have fixed on a course of action and cast about for a problem to which it is the solution, discarding problems that don't seem to fit. The solutions and problems that come to the fore might change from one meeting to the next, as given participants attend or fail to attend.
>
> Sometimes, problems are actually resolved. At lest as often, problems drift away from the choice at hand to another garbage can, not being resolved in the current round at least. Or important problems are ignored altogether, possibly because there is no available solution for them. At any rate, the

> logical structure of such a model is (1) the flow of fairly separate streams through the system, and (2) outcomes heavily dependent on the coupling of the streams--couplings of solutions to problems; interactions among participants; the fortuitous or purposeful absence of solutions, problems, or participants--in the choices (the garbage cans) that must be made.
>
> People do not set about to solve problems here . . . Rather, solutions and problems have equal status as separate streams in the system, and the popularity of a given solution at a given point in time often affects the problems that come up for consideration.

Kingdon elaborates upon his "Revised Model" of the Garbage Can Theory of Cohen et al. by stating that for a decision to be made in the federal government three "major process streams" must "couple." There must be an initial problem recognition, then the formation and refining of policy proposals, and finally politics. "So we need to understand [first] how and why one set of problems rather than another comes to occupy officials' attention" (page 92). Policy proposals are formulated and refined by "a policy community of specialists--bureaucrats, people in the planning and evaluation, . . . academics, interest groups, researchers--which concentrates on generating proposals" (page 92). Finally, "the political stream is composed of things like swings of national mood, vagaries of public opinion, election results, changes of administration, shifts in partisan or ideological distributions in [government] and interest group pressure campaigns" (page 93).

Kingdon maintains that

> These three streams of processes develop and operate largely independently of one another. Solutions are developed whether or not they respond to a problem. The political stream may change suddenly whether or not the policy community is ready or the problems facing the country have changed. The economy may go sour, affecting the budget constraint, which imposes a burden on both politicians and policy specialists that was not of their own making. The streams are not absolutely independent, however. The criteria for selecting ideas in the policy stream might be affected by the public's perception of the problems facing the country, connecting (to a degree) the political and problems streams. Despite these hints of connection, the streams still are largely separate from one another, largely governed by different forces, different considerations, and different styles.
>
> Once we understand these streams taken separately, the key to understanding agenda and policy change is their coupling. the separate streams come together at critical times. A problem is recognized, a solution is available, the political climate makes the time right for change, and the constraints do not prohibit action. Advocates develop their proposals and then wait for problems to come along to which they can attach their solutions, or for a development in the political stream like a change of administration that makes their proposals more likely to be adopted...I label an opportunity for pushing one's proposals a 'policy window'--open for a short time, when the conditions to push a given subject higher on the policy agenda are right. But the window is open for only a while, and then it closes...An item suddenly gets hot. Something is done about it, or nothing, but in either case, policy makers soon turn their attention to something else. So opportunities pass, and if policy entrepreneurs who were trying to couple a solution to the hot problem or the propitious political situation miss the chance, they must wait for the next opportunity." (page 93-94)

This final paragraph is the essence of Kingdon's revised garbage can model. He has taken a rather fuzzy theoretical model of governmental decision-making as proposed by Cohen et

al. and attached concrete criteria to it, criteria that empirical researchers can utilize. Kingdon then goes on to demonstrate the usefulness of his revised model in a qualitative study of governmental decision making. However, there is still considerable distance between Kindgon's application of the model in a qualitative manner to governmental decision making and my empirical testing of the model on decision making pertaining to wildfire at the wildland/urban interface. Fortunately, this empirical vacuum has been addressed by two pioneering studies, that of Alesch and Petak (1986), and Mittler (1988).

In their excellent book, The Politics and Economics of Earthquake Hazards, Alesch and Petak compare and contrast the responses of the city governments of Long Beach and Los Angeles, California, to the problem of earthquake hazard mitigation. Through the use of the garbage can model[3] they have compared the two cities.[4]

> The garbage can model holds that decisions are made only when four independent streams are brought together by circumstance or by skillful management. These streams are: (1) problems, (2) solutions, (3) actors, and (4) decision opportunities. (p. 233-234)

Mittler took the garbage can model one step farther by applying it empirically to data gathered by Rossi et al. (1982), who interviewed a wide variety of people including, but not limited to, public officials at the community level concerning the most common natural hazards in the United

States. Mittler took a small subset of the responses of Rossi et al. and

> . . . describe[d] the public policy agenda-setting process and, using Kingdon's model, explain[ed] why some Gulf and Atlantic Coast states enacted non-structural mitigation laws for hurricanes and resultant floods following Hurricanes Agnes and Eloise in the 1970's while others with similar risk levels did not. (p 87)

Mittler's research looked for answers similar to those the present study is seeking. He searched for an explanation for differential responses from states with similar hurricane and coastal flooding hazards while this research sought reasons for differential responses from counties with similar wildfire hazards at the wildland/ urban interface. Perhaps when viewed empirically from within the garbage can model framework, counterintuitive behavior as defined by Forrester (1971) may not be counterintuitive at all, but quite logical.

Wildfire at the Wildland/Urban Interface

Fire Ecology

Fire is an integral part of the ecology of the needle leafed forests of North America. Some trees are adapted to survive frequent fires but some, like lodgepole pine (Pinus contorta), require conflagrations that burn large areas of even-aged stands which are then replaced by new even-aged stands of the same species (Fowles 965). Many of the shade intolerant species of pine have thick bark that will withstand low intensity wildfires and southern pines can even have all

of their needles burned without killing the tree. Others trees like black spruce (Picea mariana) have serratinous cones that only open after a fire has heated them (Viereck and Little 1972). Western juniper (Juniperus occidentalis) and Rocky Mountain juniper (Juniperus scopulorum) forests of the arid west burn readily once ignited. The scrub oak communities of the Great Basin, parts of the Great Plains and the east slopes of the Rocky Mountains are also swept occasionally by wildfire. In the California chaparral communities, wildfire has historically been a major component during the hot dry summer of this Mediterranean climate. In other parts of California, exotic eucalyptus trees have spread, causing a fire hazard with their shedding of oleaginous (i. e. oily) bark.

Historical Background

Wildfire was not a hazard until European settlers began to settle in these fire-adapted ecosystems. Native Americans used fire as a hunting aid and generally had settlements that could be readily moved to escape wildfire. European settlements, on the other hand, were more permanent and susceptible to destruction by wildfire. In conjunction with that, Europeans viewed forest trees as a cash resource that could be lost in wildfires. It was the latter rather than the former that caused the U.S. Forest Service to establish a policy of wildfire suppression during the 1920s--a policy that was followed by other federal and state agencies with management

authority over forested lands. This policy generated little opposition until very recently.

Now wildfire is once again regarded as beneficial in natural ecosystems by most forest ecologists, but confounding this newly regained wisdom is the problem of an increasing number of homes, businesses, summer cabins, hunting lodges, etc. being built in fire-prone ecosystems. Owners of these structures view fire as harmful and are increasingly demanding protection from wildfire. This is the current situation in the United States.

International Problem

Wildfire at the wildland/urban interface is not a problem strictly confined to the United States, with a recent international conference being held on the issue (USDA Forest Service 1989). However, there appear to be only two other countries where the issue is being seriously addressed. Much of Canada is covered by the Taiga or Boreal Forest which is a highly fire-prone ecosystem. Summer lightning storms set thousands of fires annually in this forest which consists mostly of white and black spruce, with some pine and hardwoods mixed in. Alberta appears to have taken the lead in mitigation measures (Wildfire News & Notes Jan/Feb 1990) and in 1991 a conference was held there including those involved from a wide variety of jurisdictions (O'Shea 1991). This conference was built upon earlier work done by the Alberta Forestry Lands and Wildlife; Forest Service (No Date a, No Date b, No Date c, No Date d).

And interestingly enough, way back in 1977, someone was working on the problem in the Yukon (Nyland 1977) and stressing mitigation measures.

In Australia there are large areas covered by eucalyptus trees forming a highly flammable "bush" as it is called locally. The Australian Mutual Provident Society (1984) issued a guide called simply "Survival" which covered how to survive several types of natural hazards, although there is nothing mentioned about mitigation measures. The Bushfire Council of New South Wales (No Date a, No Date b, No Date c) has produced colorful informative brochures for homeowners in affected areas.

Federal Involvement

It is well known that as one progresses from local to state to federal agencies, the concern for natural hazards increases (Rossi et al. 1982; Petak and Atkisson 1982). But it is equally well known that natural hazards are commonly dealt with at the local level first (Rossi et al. 1982; Schneider 1990). The federal government typically takes the carrot approach in its dealings with states and smaller jurisdictions. To be eligible for federal disaster relief funds state and local governments must comply with certain regulations (FEMA 1990; Schneider 1990). The federal government also produces and disseminates informational publications and videos, and sponsors local, regional, national, and

international conferences. (See Appendix 3 for examples of wildland/urban interface publications)

State Involvement

Fire is an historic component of many natural ecosystems all across the United States and when I queried state forestry agencies asking whether wildfire at the wildland/urban interface was a problem in their state, I received not a single negative response back. However, there are some states that have had serious wildfires at the wildland/urban interface in the last few years and others where there is clearly a strong potential for such a fire. Activity, as gauged by publications, tends to be concentrated in the far west, intermountain west, and southeast states. (For a sampling of state publications on this issue see Appendix 3) Activities of different states, fall into four categories:

1. do nothing, because the issue really is not a problem, even though some people involved in emergency services express alarm;

2. do what the federal government requires to qualify the state for federal funding in case a serious wildfire occurs in the wildland/urban interface;

3. on state initiative, inform involved property owners and developers of the hazard, have conferences, usually with state, federal, and some local emergency service delivery people, but the issue still is generally voluntary (Counties are encouraged to promulgate mitigation measures but not forced to);

4. promulgate state laws and regulations that require certain types of development and construction in the hazard zones and prohibit

> certain other. These states often have statewide planning agencies that are involved, superseding county authority.

The severity of the hazard does not necessarily indicate into which category a state will fall. Especially in the latter two categories, the hazard may remain quite uniform, but what does vary is the political situation of that particular state. States with more libertarian attitudes, Utah (Cornell 1990) and Texas (Terry 1990) for example will be less likely to pass legislation restricting individual rights than will California (Corona Fire Department No Date) or Oregon (Oregon Department of Forestry 1990) which tend to have more governmental control over people's lives.

County Involvement

Rossi et al. (1982) found that "local elites," which included county administrators and politicians, had little knowledge or interest in natural hazards. The one exception was emergency services people who thought that natural hazards were more important than anyone else in their survey. This generality holds true with the issue of wildfire at the wildland/urban interface. The majority of county level people involved work in emergency services.

There are some notable exceptions to this, with at least two conferences held in Arizona aimed at local participants, one directed toward the Prescott area and one aimed directly at county officials statewide (Cirincione 1990), but in most

instances, there is little county involvement beyond emergency services.

A major exception is exemplified by the proceedings of several California counties including Los Angeles County (County of Los Angeles 1982) and Santa Barbara County (Santa Barbara County Fire Department No Date; Perry 1990a; 1990b). It should also be noted that three central Oregon counties banded together to produce the original brochure now disseminated in Washington and Oregon by several agencies (Northwest Interagency Fire Prevention Group 1988).

Multi-Jurisdictional Groups

Some of the most innovative, and, according to those involved, most successful operations are multi-county, multi-agency assemblages. To my knowledge, these only exist in the Rocky Mountains states and farther west. Some good examples are from Arizona (Kraske 1988), The Lake Tahoe Basin of Nevada and California, eastern California and western Nevada (Adams and Smith 1990; Kraske 1990), and western Montana (Wildfire News & Notes 1991). (See Appendix 3 for examples of publications from these agencies) What these and other cooperative programs have in common is that they are comprised mainly of fire fighting agencies and include few county planners, commissioners and others within county government who would be responsible for the establishment of long range mitigation measures.

Current Situation

Preliminary Attempts to Deal with the Problem

An early attempt to deal with the problem of wildfire at the wildland/urban interface (Moore 1981), consisted of a long list of recommendations, covering almost every facet of the issue. Moore concluded with four "Proposed Standards," including

1. establishing fire hazard severity class zones;
2. zoning ordinances which reflect wildland fire potential;
3. spacing and building density standards;
4. street construction parameters that would allow evacuation and access for fire fighting equipment.

Moore's ideas were embraced by many in the fire fighting fraternity. However, the social impact of these recommendations were not carefully addressed. As Gale and Cortner (1987), pertinently state

> These approaches need not, and should not, be mutually exclusive. The human dimension is intricately interwoven into the definition of the problem, and strategies for solving interface issues present numerous opportunities for economists, sociologists, psychologists, and political scientists to become directly involved in problem solving. (page 1)

Gardner et al. (1987) have explored the issue of people moving into wildfire prone areas and established that they were unaware of wildfire dangers presented by these settings. Tokle (1988), among others, has argued that public agencies

must provide better information to homeowners concerning protection of life and property in such hazardous areas.

Information on fire hazard is available from many sources, but it seems not to be reaching the people who will benefit the most from it (Gardner et al. 1985). In Florida, Abt et al. (1990) found that residents in a community hit by a severe wildfire were very concerned about the hazard and that they were receptive to more government involvement in the problem. In a preliminary survey to serve as a basis for the current research, Cook (1989a) surveyed homeowners near Gainesville, Florida and his results concurred with others (Gardner et al. 1985; 1987; Carpenter et al. 1986) who found that homeowners tend to ". . . assign low probabilities of occurrences" to fire hazards and "prefer policy strategies that shift the hazard management responsibility to public resource managers" rather than to themselves (Gardner et al. 1987).

Cook (1989b) concurred with Gardner et al. (1987), who concluded that people have a vague understanding of the natural world around them and with the intrinsic hazards associated with wildland. Nonetheless, Cook's preliminary research established that even though people living in the wildland/urban interface have a poor understanding of the problem, there is an interest and willingness to learn. Wildland/urban residents desire specific information about prescribed burning, including what happens to wildlife in the

case of fire (Cortner et al. 1984). Taylor (1984) discovered that many people in his study actually found light burns in Ponderosa pine forests to be aesthetically pleasing.

In addition, Sorensen (1983) states

> The process by which people acquire information and knowledge about rare natural events as well as other environmental topics that have an impact on society, is not well documented or understood. . . .The research findings suggest that the individual process of acquiring information on natural hazards is as diverse and fragmented as the efforts and attempts to disseminate it . . . Contrary to other studies, awareness of a hazard was not found to be a good predictor of knowledge of adaptive behavior.

Sorenson's findings agree with Forrester (1971), who found that an individual or a governmental agency trying to solve a problem might actually be exacerbating it. This can be caused by lack of agency cooperation, inappropriate techniques for the problem, failure to involve all affected participants, both agencies and individuals; and lack of interest by citizens until late in the planning process.

Other authors (Kates 1971; Burton et al. 1978) make the poignant comment that natural hazards are nothing but natural events until they come in contact with human systems. In the same vein, Mitchell (1974) states that what might be considered a natural hazard by one society is taken in stride by another. Hewitt (1983) claims that current methods of dealing with natural hazards (post-disaster relief) are sending the message to individuals that there is no problem that the government can not fix.

Rossi et al. (1982) interviewed "community elites" in twenty states and 100 communities that were exposed to four natural hazards (not including wildfire) and concluded that concern over natural hazards among these community elites was low. They also found that the interviewees were more supportive of traditional policy approaches, including structural mitigations and post-disaster relief from the Federal government. Support for hazard mitigation measures was low. However, the fieldwork of Rossi et al. was done thirteen years ago, before the Federal government philosophically changed policy emphasis from federal-based assistance to local control.

In a more recent study Palm, 1990 investigated earthquakes via the use of an "integrative framework," and viewed response to a hazard from three levels,

> Those subjects that are indivisible as functioning units (the human individual) and small aggregates that function as units (the household) are considered micro levels of analysis. The socio-politico-cultural environment within which individuals/-households function (the nonphysical environment or milieu) are considered macro scale. (Palm, 1990, p. 19)

Palm notes that much research has been conducted at the micro level, but very little at the macro level. Her study of earthquakes, links the micro and macro levels and identifies an intermediate, meso level, that includes "planners, emergency managers, real estate agents, or other bureaucrats who translate societal rules to constrain or enable the actions of individuals."

Palm continues

> A problem within this research tradition has been, as Saarinen has pointed out, that there is relatively little known about 'what behavioral difference does it make if a person has an inaccurate versus a more accurate perception of a particular hazard. (Palm 1990, p. 65 quoting Saarinen, 1982, p. 2)

While there is a large volume of sample-survey research dealing with natural hazards at the micro (individual) level there are few studies of decision makers at the meso level. Some of the questions concerning the poor macro-micro interplay can be answered with a better understanding of these people in the middle; who they are, what they are doing, and why.

What Is Being Done Now

Can any of the problems of fire at the wildland/urban interface be addressed from within the garbage can model? I believe so. But first research of a more holistic nature than the pieces written with an emergency services orientation must be reviewed.

One issue that has begun to arise is one of priorities. Fire fighting resources have been directed more and more toward structures placed in the wildlands which has allowed fires to destroy more forest than would have been the case had the structures not been there (Walt 1989). Walt also notes that the total loss due to wildfire since 1970 in California has been approximately equal to the losses from earthquakes or

floods during the same period of time, and this is considerably amount.

Cortner et al. (1990) interviewed a wide range of USDA Forest Service fire management personnel searching for priorities in fire fighting. Resources came out last on the protection priority list among the very people whose job is supposedly to protect the resources. They are being forced to protect lives first, private property second, *only then* forest resources (see also Cortner and Lorensen unpublished). But if it is not the fire fighting professional land managers' jobs to protect the people living in the interface from wildfire, whose job is it? If private citizens are not particularly interested and public land management agencies have readily moved into the area to fight the fires, where lies the problem? The problem is that public land managers are beginning to want out. The solution may rest with county and local governments. These government agencies do not have fire suppression capabilities to deal with fires in the interface (Walt 1989), nor do they realize that protecting homes in the interface will create impacts that are not intuitively obvious in, at least three ways, as Irwin (1987 p-40) states:

> First, it requires an increased fire management capability, that of managing both wildland and structural forces at the same time. Second, it materially increases costs: protection of life and property become primary objectives and all nearby structures must be guarded by additional forces, even though they may not be directly or immediately

> threatened. Finally, defense of structures inevitably results in greater natural resource losses.

Counties have not shown much interest in dealing with the problem (Bradshaw 1987), but perhaps it has not been simply a lack of interest on their part, but also a lack of assigning a high priority to problem solving by state and federal governments. A clear example of a rural county that has taken it upon itself to deal with the problem on its own is Jefferson County, Colorado (Groves 1988) where

> The county planning department was in the process of developing a geographic information/modeling system (GIS) to be used for plan development and development review. We applied for and received funds from the state that helped us to continue development of the automated system and collect resource information about the county such as vegetation, surface material, geology, and a host of other issues. (p. 91)

Groves goes on to lay out what, to my knowledge, is a unique program for a rural county in addressing the problem. Jefferson County included wildfire in all aspects of its planning efforts, from the very beginning, instead of seeing the problem as not being integral to the planning process. The county includes wildfire as part of its comprehensive land use plan; in its zoning; review of developments; building permits and even includes an information and education program, all within the context of a GIS program.

A point to be noted is that the initial impetus to begin the process came from the state, in the form of legislation. The county was prepared to capitalize upon the states interest and obtained state money to proceed (p. 91). So the state

government was involved at two levels, providing a goad and later a carrot, but the county had an interest even before state action.

Enter the Current Research

Perhaps the most succinct description of where this research will fit into the problem of protecting people, economic natural resources, watershed, and ecosystems in the wildland/urban interface is a quote from Davis (1990 p. 31):

> However, efforts at communicating with these groups [the public, particularly policy leaders] have not been very effective. the large number of meetings, symposia, and workshops held throughout the nation have had one result--fire fighters talking to fire fighters. Although homeowners, insurance agents, community planners, and others with a stake in the problem have been invited, they failed to see the need to attend.
>
> These unsuccessful efforts show the need to understand the motivations, perceptions, and values within and between the various groups involved in the wildland-urban interface area. Land managers need to know how these people influence the adoption of fire-safe ideas and practices. How can motivation and innovation be used, or modified, to influence the fire awareness and behavior of these various groups? County agents and farm advisers have identified agricultural 'opinion leaders' who must be convinced before other farmers will follow and accept new ideas. Who are the opinion leaders in the wildland-urban interface community, and how do we reach them?

Irwin (1987, 1989) seems to have been the first to seriously address the problem of lack of state guidelines pertaining to the way in which counties to deal with this problem. Irwin (1987, p. 42) notes that:

> However, there is strong reason to believe that much of the weakness could be corrected by

> providing legal and technical guidance to both fire managers and planners. For example, the preponderance of seismic data is in the Safety Elements because the California Division of Mines and Geology developed guidelines for planners. The flooding background data is in the plans because hydrologists designed ways for that data to be included, and the legislature directed its inclusion. In both cases, description and technical proof of general public hazards were provided to local governments. *To date, fire services (at all government levels) apparently have concentrated their inputs on a case-by-case on issues* (italics added).

What Irwin has done is to throw a challenge into the face of the complaining land managers. He is telling them to begin providing base level information to counties and cities on their hazard of interest (wildfire) like those involved in other hazards (earthquakes and floods) if they expect similar coverage in county plans. Irwin followed his own advice in 1989 and published A Discussion of the County General Plan and the Role of Strategic Fire Protection Planning under the auspices of the California Department of Forestry and Fire Protection.

Davis (1987) surveyed fire managers in several states and found concern, but there appears to have been no direct action taken to redress the lack of guidelines given to counties for their general plans. In one of the few peer reviewed publications on the issue of wildfire at the wildland/urban interface, Davis (1990) covers a broad range of topics including the problem of lack of county and city planning (p. 30). Only with a rather oblique reference to the problem of providing useful information to county planners Davis (1988) suggests

that understanding the dynamics of demographics (e.g. educational and cultural background, previous living situations, environmental awareness, etc.) of the people who move into the interface area would be helpful.

Rice and Davis (1991) researched the situation in three foothills counties of central California, in the same area in which Irwin works. They found that (p. ii):

> General Plans in California generally neglect mitigation measures--the language is often 'encourage' vs. 'shall.' Fire protection strategies for all three counties have been to zone for low density in high fire hazard areas.
>
> Existing regulations provide opportunities for fire departments to review plans and voice opinions, however, fire departments are often too small to promulgate regulations. Small departments, usually supported by local taxes, find that stiff regulations are difficult to have passed by elected officials because of the influence of the real estate industry. Also, these small departments do not have the resources to check plans or to attend community planning meetings. In contrast, large fire departments have assigned plans-checkers and may have more influence.

It is clear from this statement that county governments could greatly benefit from state and federal help similar to the help that has been provided in the cases of earthquake and flood hazards. It is also clear from the research cited above that there is not much interaction between federal, state, and county planning and policy implementation. I am tempted to suggest that "Muddling Through" (Lindblom 1959; Golde 1976) is the technique being used by county governments to manage. It is a technique that has served them well in the past, but does not respond quickly to a need for change. In fact the only

continuity is between fire fighters at the three levels of government and they do not seem to be solving the problem, just complaining about it and suggesting what others should do to solve it.

Current Research

This research is intended to fill a void in the literature. There have no books written that have seriously included wildfire at the wildland/urban interface as a natural hazard. Coverage has either been nil or cursory. As the above literature review clearly demonstrates, almost nothing has been published in juried journals on the issue. Nearly all that has been written has come from professionals in the emergency services field. Without intending to diminish the important contributions of Irwin and Davis and others, I do believe that my research will be of value to professionals in the field. I have demonstrated concisely very important differences between professionals working at the federal and state governments on one hand and county officials on the other. Furthermore through the use of the Kingdon model, I have clearly shown that administrators in counties without Wildfire Hazard Mitigation Plans view the problem significantly differently from those in counties with such plans. I have also shown where those differences lay.

Endnotes:

1.The difference between a "natural hazard" and a "natural disaster" is one of timing. A natural hazard is the actual event that occurs, say an earthquake, or in my case, a wildfire, while a natural disaster is the damage done to humans and the human built environment by the occurrence of the natural hazard.

2. Major exceptions to this generality include the massive transfer of federal money to California for all phases of earthquake hazard work (Palm 1990) and for coastal zone management work in the southeastern states (Petak and Atkisson 1982).

3. The "Garbage Can Model" referred to here by Alesch and Petak and elsewhere by Mittler was apparently originally proposed by Cohen, March and Olsen in "A Garbage Can Model of Organizational Choice," Administrative Sciences Quarterly: 17:1-25. It was elaborated by March and Olsen in their book Ambiguity and Choice in Organizations in 1976. Kingdon revised the model and used it to assess governmental policy making in his book Agendas, Alternatives, and Public Choice in 1984. Subsequently, it is from Kingdon's book that Alesch and Petak, and Mittler took their direction.

4. This "Conceptual Policy Making Model" makes so much sense that I will quote extensively from Alesch and Petak. A problem must exist before action can be even contemplated. A problem can be thought of as a disparity between the perceived and desired states of affairs. Therefore, a given set of phenomena may constitute a problem for some and not for others, depending on their respective values and perceptions. Research suggests strongly that most people tend to discount dramatically the risks associated with low-probability, but high consequence events. Most people never experience a severe earthquake and regard the probability of one occurring as very low. Therefore even if the prospect of a killer earthquake exists, the event is likely to have low political salience, especially for citizens and public officials who have more urgent matters on their minds.

Solutions, in the garbage can model, exist independent of problems. In order for policy to be made, it is necessary that someone match a solution that is generally perceived as workable with a problem that is generally considered to warrant some action.

However, having a problem and a matching solution is not enough. there must also be actors who are willing to invest the considerable amount of time and energy required to match a solution with a problem, and there must be an opportunity to get the matter on the agenda. That is, there must be a window

of opportunity--a time when the actors, solution, and problem can be brought together in an appropriate forum and find space on the agenda in order for policy to be formulated.

CHAPTER 3
MATERIALS AND METHODS

Overview of Research

Identification of Study Sites

To be included in the study a county had to fall into at least one of three categories:

1. It must have had a wildfire that destroyed structures built in the interface in the last ten years, or

2. A comprehensive wildfire hazard mitigation plan must have been developed, or

3. A state forester has identified it as being very vulnerable to the occurrence of a wildfire in the wildland/urban interface.

Counties were identified by consulting state forest fire records and state forestry officials, in various states. An attempt to locate some counties ranking high in each of the categories was made. However, as no data were available to neatly place counties into the listed categories, there is a chance that some good candidates were missed.

The study includes 37 counties in twelve states (see Figure 1 and Table 3-1). It must be made clear that this was not a random sample survey. States that have the most severe problem with wildfire at the wildland/urban interface were identified through information made available by the National

Fire Prevention Association. Contact was made with fire management professionals in those states in order to select the two to four counties that exhibited the greatest vulnerability or historical frequency of occurrence of wildfire.

FIGURE 1

Counties with fires in the wildland/urban interface studied in this dissertation

Table 3-1
Responses to Survey

State-County	Mailed Out	Returned	% Returned
WA-Okanogan	20	15	75%
County	9	6	67%
State	4	3+1*	75%
Federal	7	6	86%
WA-Spokane	16	11	69%
County	13	8	62%
State	2	2+1*	100%
Federal	1	1	100%
WA-Chelan	17	10	59%
County	10	7	70%
State	+1	+1*	0%
Federal	6+1	3	43%
WA-Kittitas	15	7	47%
County	10	3	33%
State	2	1+2*	50%
Federal	3+1	3	75%
WASHINGTON TOTAL	69	44	64%
County	42	24	57%
State	9	7*	78%
Federal	18	13	68%
MI-Delta	14	11	79%
County	9	6	67%
State	1	1+1*	100%
Federal	4	4	100%
MI-Crawford	12	7	58%
County	11	6	55%
State	1+1	1+1*	100%
Federal	0	0	0%
MI-Ogemaw	17	8	47%
County	14	6	43%
State	1+1	1+1*	100%
Federal	2	2	100%
MICHIGAN TOTAL	44	28	64%
County	34	18	53%
State	4	4*	100%
Federal	6	6	100%

*Includes respondents involved in more than one county.

Table 3-1--continued

State-County	Mailed Out	Returned	% Returned
CO-Jefferson	10	7	70%
County	7	5	71%
State	1+1	1+1*	100%
Federal	2	1	50%
CO-Summit	14	9	64%
County	11	7	64%
State	1+1	0+1*	0%
Federal	2	2	100%
CO-Boulder	11	6	55%
County	8	5	63%
State	1+1	1+1*	100%
Federal	2	0	0%
CO-Chaffee	17	12	71%
County	11	7	64%
State	2+1	2+1*	100%
Federal	4	3	75%
COLORADO TOTAL	53	35	66%
County	37	24	65%
State	6	5*	83%
Federal	10	6	60%
MT-Lewis & Clark	15	11	73%
County	8	6	75%
State	1+1	1+1*	100%
Federal	6	4	67%
MT-Flathead	16	12	75%
County	8	5	63%
State	1+1	1+1*	100%
Federal	7	6	86%
MT-Missoula	17	13	76%
County	8	5	63%
State	2+1	2+1*	100%
Federal	7	6	86%
MONTANA TOTAL	49	37	76%
County	24	16	67%
State	5	5*	100%
Federal	20	16	80%

*Includes respondents involved in more than one county.

Table 3-1--continued

State-County	Mailed Out	Returned	% Returned
AZ-Yavapai	17	11	65%
County	11	6	55%
State	1+1	0+0	0%
Federal	5	5	100%
AZ-Gila	19	10	53%
County	8	2	25%
State	1+1	1+0	100%
Federal	9	7	78%
ARIZONA TOTAL	36	21	58%
County	19	8	42%
State	3	1	33%
Federal	14	12	86%
OR-Jackson	19	15	79%
County	9	6	67%
State	1+1	1+1*	100%
Federal	10	8	80%
OR-Douglas	19	14	74%
County	10	5	50%
State	1+1	1+1*	100%
Federal	8	8	100%
OR-Deschutes	19	12	63%
County	10	6	60%
State	1+1	1+1*	100%
Federal	8	5	63%
OREGON TOTAL	57	42	72%
County	28	17	56%
State	4	4*	100%
Federal	25	21	84%

*Includes respondents involved in more than one county.

Table 3-1--continued

State-County	Mailed Out	Returned	% Returned
FL-Charlotte	10	8	80%
County	8	6	67%
State	0+5	0+5*	0%
Federal	0	0	0%
FL-Sarasota	9	5	56%
County	8	4	50%
State	2+3	2+3*	100%
Federal	0	0	0%
FL-Flagler	13	10	77%
County	12	9	75%
State	1+3	1+3*	100%
Federal	0	0	0%
FLORIDA TOTAL	34	25	74%
County	28	19	68%
State	6	6*	100%
Federal	0	0	0%
SD-Pennington	16	10	63%
County	12	6	50%
State	1+1	1+1*	100%
Federal	3	3	100%
SD-Lawrence	15	9	60%
County	12	7	58%
State	1+1	1+1*	100%
Federal	2	1	50%
SD-Custer	12	9	75%
County	9	6	67%
State	1+1	1+1*	100%
Federal	2	2	100%
SO. DAKOTA TOTAL	44	29	66%
County	33	19	58%
State	4	4*	100%
Federal	7	6	86%

*Includes respondents involved in more than one county.

Table 3-1--continued

State-County	Mailed Out	Returned	% Returned
CA-Santa Barbara	14	13	93%
County	9	8	89%
State	0+1	0+1*	0%
Federal	5	5	100%
CA-Plumas	20	16	75%
County	7	6	86%
State	+1	+1*	0%
Federal	13	10	77%
CA-Eldorado	20	15	75%
County	10	6	60%
State	1+1	1+1*	100%
Federal	9	8	89%
CALIFORNIA TOTAL	55	45	82%
County	26	20	74%
State	2	2*	100%
Federal	27	23	85%
TX-Denton	10	5	50%
County	8	1	13%
State	2+1	2+1*	100%
Federal	0	0	0%
TX-Bexar	9	7	78%
County	8	6	75%
State	1+1	1+1*	100%
Federal	0	0	0%
TX-Harris	10	3	33%
County	7	2	29%
State	3+1	2+1*	66%
Federal	0	0	0%
TEXAS TOTAL	30	15	50%
County	23	9	39%
State	7	6*	86%
Federal	0	0	0%

*Includes respondents involved in more than one county.

Table 3-1--continued

State-County	Mailed Out	Returned	% Returned
AR-Saline	14	9	64%
County	8	4	50%
State	3	2	67%
Federal	3	3	100%
AR-Pulaski	7	4	57%
County	6	4	67%
State	1	0	0%
Federal	0	0	0%
AR-Garland	9	8	89%
County	5	5	100%
State	0	0	0%
Federal	4	3	75%
ARKANSAS TOTAL	30	21	70%
County	19	13	68%
State	4	2	50%
Federal	7	6	86%
UT-Utah	15	8	57%
County	8	3	38%
State	2+2	2+2*	100%
Federal	5	4	80%
UT-Davis	11	3	27%
County	9	2	22%
State	0+2	0+2*	0%
Federal	2+1	1+1*	50%
UT-Weber	11	9	82%
County	9	7	78%
State	0+2	0+2*	0%
Federal	2+1	2+1*	100%
UTAH TOTAL	37	27	69%
County	26	15	58%
State	4	4*	100%
Federal	9	8	89%
STUDY TOTAL	543	369	68.0%
County	339	202	59.6%**
State	58	50*	86.2%**
Federal	138	117*	84.8%**

*Includes respondents involved in more than one county.

**County respondents represented 54.7% of the total response;
State respondents represented 13.6% of the total response;
Federal respondents represented 31.7% of the total response.

Identifying Officials to Interview

The decision makers interviewed in this research represent three distinct groups; county, state, and federal employees involved in decision making (or policy establishment) as regards the problem of wildfire at the wildland/urban interface. Therefore, at the interviewee level, as with the state and county selection process, this was not a random survey, but the result of the identification and interviewing of a precise population within the selected counties.

Interviewees included

1. At the federal level, USDA Forest Service personnel including District Rangers (or Bureau of Land Management Resource Area Managers); National Forest and Ranger District fire management personnel.

2. State forestry employees closely associated with wildland/urban interface issues.

3. County elected officials, civil servants, appointed positions, and volunteer fire fighters.

To identify decision makers in the selected counties, about a fourth of interviewees were contacted in advance by telephone. These official's assistance was invaluable in identifying other decision makers. Five hundred forty-four individuals were identified and eventually contacted.

Administration of Questionnaire

Initial plans were to administer the questionnaire via telephone, but other survey researchers advised that the questionnaire was too long and two intricate to administer via that technique. Mail questionnaires are less likely to be

misinterpreted by the interviewee and less expensive to administer if labor costs are not considered. Questionnaire design and administration followed the recommendations of Dillman (1978).

Each interviewee was sent a color and number coded questionnaire (brown=county; green=state, blue=federal) identifying them individually, their home state, level of government employment. A cover letter, return postage, and a return mailing label (to be affixed to the same envelope used for the outgoing mailing) were included. After one week, each individual was reminded by a follow-up postcard (even though no one had time to return the questionnaire in that period of time, Dillman suggests that it will get the questionnaire out from under other work and bring it back to the receivers attention). After one month, a second copy of the questionnaire along with a cover letter, a return label, but no return postage was mailed to each non-respondent. Finally, after seven weeks a third copy of the questionnaire complete with cover letter and return label were sent. This final appeal went via certified mail in an attempt to convince the interviewee of the seriousness of the research.

Using Dillman's method, return percentage were good, with 369 out of 543 (68%) questionnaires being completed and returned (even before those that went to persons no longer involved, the terminally ill, ones that county employees refused to deliver to planning commissioners, etc. were

subtracted). As can be seen in Table 3-1 return rates varied from state to state and from county to county. Return rates also differed substantially between the three levels of government, with the county responses being the lowest at 59.6%, state at 86.2%, and federal at 84.8%. The great disparity between the county responses and the other two is not surprising as county interviewees frequently (as will be presented later) had a wider range of responsibilities than did state or federal respondents. The high rate of non-responses from county officials may be the result of individuals being contacted within county governments who do not consider this issue enough of a problem to warrant responding.

Survey Questionnaire Contents

Each of the individuals was asked both closed and open-ended questions (Appendix 1). Questions were roughly patterned after those used by Rossi et al. (1982) for their book, Natural Hazards and Public Choice, in which they surveyed "community elites" on a range of natural hazard topics which, however, did not include wildfire.

To obtain the best profile of the interviewees, a number of open-ended questions were inserted following key closed-ended ones.

The robustness of a certain statement is not based upon the number of questions tested which supported the hypotheses being tested. Responses to questions that were pertinent to

the hypotheses were tested. In some cases this meant a large number of questions and in others a rather small number. The survey was designed to contain as little redundancy as possible, thus avoiding the pitfall of having responses to several questions providing information that is highly correlated. I believe that there is little correlation among the various questions tested. Each question sought unique information.

Specific Objectives

Objective 1.

> To test for consistency of responses among federal decision makers working in different counties, utilizing questions that probe interviewees knowledge of wildland/urban interface history, issues, and problems; analysis of attitudes toward existing and hypothetical management scenarios; and their involvement in and attitude toward wildfire hazard mitigation measures. Similar tests for consistency among state and county decision makers utilizing questions tailored specifically to each group were performed.

The first objective was tested via analyses of responses to questions asked of all interviewees, including the rating of wildland/urban interface problems (Questions 1, 2, and 3), the importance of wildfire as a hazard (Q4 and Q8), knowledge of past wildfires in their county (Q5-Q7), attitude toward mitigation measures (Q13, Q14, Federal Questions 18 and 20, State Questions 22-25, and County Questions 29-31).

Questions specific to one level of government were also analyzed. Federal decision makers were probed for attitudes towards mitigation measures that would involve federal agencies (F9-F12, F15), knowledge of mitigation measures initiated by an interviewees own agency (F16), and knowledge of involvement by federal agencies (F21).

State decision makers knowledge of, and attitude toward, mitigation measures that a state might take (S9, S10a, S10b, S11, S12a, S15, S16a, S17, S18a, S18b) were analyzed. County decision makers were asked similar questions pertaining to actions a county might take (C9, C12, C15a, C17, C18, C19a, C19b, C20, C21a). It was expected that federal decision makers would exhibit the most uniformity in their responses; state decision makers would show less uniformity; and that county decision makers would muster the least uniformity.

Objective 2.

> To assess the uniformity of responses between the three levels of decision makers, e.g. are federal decision maker responses similar to those from state and county decision makers, utilizing the same comparisons as objective 1.

When testing the hypothesis of inter-group uniformity of responses amongst the three groups, individuals were compared on the following issues:

1. Rating problems associated with the wildland/ urban interface (Q1, Q2a), and who should be responsible for them (Q3);

2. Rating the importance of wildfire as a natural hazard (Q4 and Q8);

3. Knowledge of past wildfires in the county (Q5-Q7);

4. Attitude toward mitigation measures (C28-C31, S21-S24, F17-F20).

It was assumed that federal and state responses would be more closely associated than either federal and county or state and county as questionnaires were sent to federal and state individuals who work with fire as a profession. County respondents, on the other hand included a wider range of professions, including people who work with fire as a profession, but also included county commissioners who are politicians with varied backgrounds, planning personnel who may be trained to deal with urban expansion, and perhaps the most varied, the planning commissioners, who have been either elected or appointed and come from widely disparate backgrounds, from business professionals to housewives.

Objective 3.

> To determine how these responses and propositions vary among decision makers with different personal backgrounds, education, and experience with the hazard.

To better understand the depth and breadth of individual federal, state, and county decision maker involvement in and attitude toward adoption of wildfire hazard mitigation measures the following information was solicited:

1. Demographics, including professional experience, experience with the hazard, education, and length of residency in state and county (Questions C32a, C32b, C33b, C33e, C34, C35, C37, C27a, C27b, C28b, C28f, C29, C30, C32, C23a, C23b, C24b, C24e, C25, C26, C27, S27a, S27b, S32b, F23a, 23b).

2. Is wildfire at the wildland/urban interface a problem, and if so how important, and who should address it (Q1, Q2a)?

The assumption is that individual federal decision makers have greater experience, are the most knowledgeable, and have the greatest interest in the adoption of mitigation measures, with less knowledge and interest among state decision makers, and, even less among county decision makers.

Objective 4.

> To test the validity of the Kingdon model on wildfire hazards at the wildland/urban interface. Have counties with wildfire hazard mitigation plans in place met the four criteria of the model; (1) was there a perceived problem, (2) were solutions recognized, (3) were people available to work on the issue, and (4) was a window of opportunity open in which to implement the measures? Conversely, were any of these criteria missing in a county where mitigation measures were not adopted?

The Kingdon model was tested utilizing government decision makers attitudes and actions toward wildfire at the wildland/ urban interface

The first "stream", namely "is there a problem", was addressed by several questions in the questionnaire, including Q1, Q3, Q5, Q7, Q32a, and Q32b.

Analysis of the second required stream, "are there solutions,", utilized questions Q6, Q9, Q8, C27, C28b, C29, C30, C31, C10a, C11, C12a, C13, C14a, C15a, C16, C17, and C18.

The third stream requirement, whether there are people available to work on the issue, was addressed through qualitative explanations to questions C27-6, C27-7, C27-8, C33a.

Finally, to find out whether there was a window of opportunity in which to implement the measures, questions Q4c and Q5b were analyzed. These items sought information on past fire history in the county. Conversely, were any of these criteria missing in county where mitigation measures were not adopted?

Chapter 4 provides analysis and comments on the responses to the questions identified above. Each objective is investigated in depth and the results are compared to the original assumptions.

CHAPTER 4
DIFFERENCES BETWEEN THE THREE LEVELS OF GOVERNMENT

This chapter includes analysis pertinent to the first three objectives discussed in Chapter 3. To allow more thorough perusal of the analyzed data in tabular format and to reexamine specific question wording, Appendices 1 and 2 have been included.

Are These Individuals Unique?

The assumption that federal officials would be more alike than their state counterparts, who in turn would be more alike than county employees was extensively probed.

Analysis of responses concerning the existence of problems in the WUI, the responses revealed some intra-group consistency but perhaps not as much as expected. The federal respondents exhibited strong uniformity of responses on only three of 14 problems; "Planning," "Fire Protection for Homes," and "Increased Wildfire Potential." State officials agreed on "Planning," "Fire Protection for Homes," "Competing Government Agencies," and Increased Wildfire Potential." County respondents showed strong consistency on "Fire Protection for Homes," and "Increased Wildfire Potential."

On two of the problems where responses indicate intra-group consistency, there is also consistency between groups. Clearly there is not much evidence to draw strong conclusions on intra-group consistency differences among the three groups. Since the common denominator for the individuals who were surveyed is an involvement in WUI problems, it should not be surprising that they all tend to agree (regardless of their level of government) on wildfire issues and are more likely to disagree on other issues with which they have less knowledge. *It appears from responses on this issue that working on WUI problems is more important in contributing consistency than working within a particular level of government.*

When asked for other problems specifically related to the wildland/urban interface a phenomenon that occurs repeatedly throughout this study first surfaced. Even though 217 out of 369 people had other problems that they felt were important, intra-group consistency varies. Sixty seven percent of federal responses were "Yes", 20% "No", and only 13% failed to offer any additional problems. Most state officials (72%) had other important problems to highlight, 12% did not, and only 12% failed to respond. At the county level, on the other hand, only 51% had further problems, 30% had none, but an important issue here is that 20% failed to respond at all. It is clear that at the county level there are fewer "Other Problems". This may be a reflection of the greater diversity of job categories represented by county respondents. They

agreed on the big issues related to the WUI, as evidenced by their agreement on the importance of wildfire as a problem, but that agreement is rather shallow, and when asked for other problems, they came up short.

Intra-group consistency emerged the strongest at the state level, followed by federal, and finally county. *The hypothesis of consistency is supported by the county responses, but not in the federal and state answers.*

Concerning what problems are bothering individuals, both federal and state respondents clustered their problems into three categories, "Private citizen problems," "Administrative Problems," and "Resource Management Problems," with 84% of the problems listed falling into one of these categories. But county responses showed less uniformity, with only 70% of the "Other problems" being in these three groups, thus supporting the hypothesis. The same explanation given above holds true once again. County officials have other things on their mind, and although they address the large issues related to the WUI, they also concentrate on other major issues related to other county problems. These other major issues are more important than small items related to the WUI fire problem.

When given a list of WUI problems and asked who should be responsible for each, some interesting sub-group differences arose.

Federal respondents ascribed primary responsibility for "Planning" (65%), "Home Fire Protection" (65%), "Road

Maintenance" (77%), "Zoning" (85%); "New Road Construction" (71%), and "Demand For Urban Services" (64%) to counties. They allocated responsibility for "Water Pollution" (53%), and "Competing Demands For Water " (64%) to state government. On "Soil Erosion" and "Commercial Timber Adjacent To Homes" there was no majority agreement.

Arising from these responses are two important points, (1) *not in one instance did a majority of federal employees feel that federal or municipal governments are primarily responsible for any of these problems;* 2) in two problems there was no consensus as to what level of government should be responsible, while on two other items they could muster only 56% agreement.

State respondents gave to county government responsibility for; "Planning" (80%), "Home Protection" (56%), "Road Maintenance" (88%) "Zoning" (92%), "New Road Construction" (79%), and "Demand For Urban Services" (70%). They gave themselves responsibility for "Water Pollution" (59%), Competing Demands For Water" (62%), and "Commercial Timber Adjacent To Homes" (50%). There was no majority agreement on only one problem, "Soil Erosion."

County respondents ascribed responsibility to themselves for "Planning" (81%); "Road Maintenance" (64%); "Zoning" (83%); and "New Road Construction" (56%). They gave state governments responsibility for "Water Pollution" (61%) and "Competing Demands for Water" (58%). There was no majority

agreement on "Home Fire Protection", "Commercial Timber Adjacent To Homes", "Demand For Urban Services", and "Soil Erosion."

To summarize response consistency among the three subgroups, federal employees exhibited a majority consensus on what level of government is primarily responsible for eight out of ten problems. A plurality of state officials found accord on an equal number; but county respondents could only muster agreement on six of ten. Once again *results partially support the hypothesis that county officials are less likely to present a uniform response than either their federal or state peers.*

An explanation might very well be that counties are continually strapped for funding and they are frequently searching for help in meeting the financial demands for services, therefore they have indicated who they *wish* were responsible for some of the problems presented. On the other hand, the federal officials seem to often be wishing that problems could be dealt with by someone besides county government, indicating a frustration with inaction, or a lack of understanding of local politics.

Interviewees were also given a list of natural hazards and asked whether their jurisdiction had suffered any of them in the last ten years.

At the federal level there was majority agreement on "Earthquakes (No, 96%), "Wildfires" (Yes, 91%), "Droughts"

(Yes, 91%), "Mudslides" (No, 70%), "Severe Winds" (Yes, 66%), "Severe Snowfalls" (Yes, 62%), and "Floods" (Yes, 53%). They were in majority agreement on all natural disasters.

State employees agreed on "Droughts" (Yes, 100%), "Wildfires" (Yes, 96%), "Earthquakes" (No, 95%), "Severe Winds" (Yes, 80%), "Mudslides" (No, 75%), "Severe Snowfall" (Yes, 66%); and "Floods" (Yes, 57%).

At the county level, the strongest accord was found for "Earthquakes" (No, 94%), "Wildfires" (Yes, 82%), "Droughts" (Yes, 83%), "Severe Winds" (Yes, 62%), "Mudslides" (No, 73%), "Floods" (Yes, 56%), and "Severe Snowfalls" (Yes, 54%).

The above responses allow only one conclusion, that there is majority agreement within each subgroup on all natural hazard occurrence between 1982 and 1992. *There is no hypothesis support on the issue of hazards*. Apparently, the hazards listed were important enough that most individuals were aware of their occurrence.

After asking what natural hazards had occurred in their jurisdiction in the past ten years, officials were queried as to the probability of the same hazards occurring in the next ten years.

Measures of central tendencies, standard deviation and kurtosis that identify sub-group continuity were investigated for these responses. Uniform criteria of a standard deviation of less than 29 and/or a positive kurtosis were used to indicate significant agreement.

Using the above criteria, federal respondents presented agreement on five out of seven hazards (71%), "Drought", "Wildfires", "Mudslides", "Earthquakes", and "Floods". No continuity was exhibited for "Severe Winds" or "Severe Snowfalls."

State officials agreed on four out of seven (57%) hazards, "Drought", "Wildfires", Mudslides", and "Earthquakes". No continuity was exhibited for "Severe Snowfalls," "Severe Winds," or "Floods."

County responses were uniform on three out of seven (43%) hazards, "Wildfires", "Mudslides", and "Earthquakes". There was no continuity for "Drought," "Severe Snowfalls," "Severe Winds," or "Floods."

The hypothesis that federal officials will respond in a more uniform manner than state counterparts, who will in turn exhibit more agreement than their county peers is supported strongly by the above responses. This is a significant finding, as the probability of a hazard occurring must be high before government officials will act by instigating mitigation measures. Since most mitigation measures are introduced at the county level, the lack of response uniformity among county officials seems to indicate that this disagreement could hinder the establishment of measures. Lack of agreement among county officials may be due to two factors. As has been demonstrated by responses to other issues, those in charge at the county level are more likely to leave property owners to

solve their own problems. This attitude would have county officials getting less excited by an event. For instance, a "severe snowfall" to a federal official might be viewed as less serious by their county counterparts because county government is more likely to expect property owners to dig themselves out. Secondly, due to the broader nature of their jobs, individuals working for counties may be better able to keep "natural hazards" in perspective when viewed against a background of economic and political problems--problems that are less intrusive to resource managers at the state and federal levels of government.

At this point queries were restricted to individuals who had indicated that a wildfire had occurred in their jurisdiction since 1982. They were asked about long-term consequences, like long-term economic impacts, as a result of the fire(s).

Responses from all three sub-groups demonstrated little agreement, with 59% of federal responses being "Yes"; 52% of state interviewees being the same; and from the county level, 53% indicating "No." There is precious little support for the hypothesis on this issue. What does surface is that about half of the interviewees believed that there have been long-term effects from the fires and half did not. This lack of response uniformity among the individuals surveyed once again bodes badly for those who are attempting to justify the institution of hazard mitigation measures.

Perhaps the ambiguity among respondents on the problem of long-term effects from fires in their jurisdictions is more a reflection of the vagueness of the question than some aspect attributable to the interviewees themselves. Since all of the individuals who responded to the survey work for the government, they are personally isolated from economic imperatives (at least within a wide latitude) and the survey is requesting that they speculate about an issue that is beyond their own lives.

The ambiguity of responses concerning long-term economic effects leaves little room for surprise on responses about changes in local or state public policy. Only federal officials exhibited any agreement, with 81% responding "No." State and county respondents were about evenly split between "Yes" and "No." However, it is a little discouraging that there is not even any agreement concerning policy changes in counties that had experienced wildfires. Thus, there is some support for the hypothesis that federal officials are most likely to exhibit intra-group consistency.

This result is even more difficult to interpret than the previous one. It would seem reasonable that county officials in counties that had experienced wildfires would be aware of policy changes that had resulted from a wildfire occurrence.

When those who responded that there had been policy changes were asked to elucidate them, once again federal interviewees gave the most consistent answers with 67% listing

either "Increased Regulation" or "More Interagency Cooperation" as the change. State and county responses were more diverse, with about half reporting the same two changes. However, the number of different county responses was a higher percentage than either of the other sub-groups.

Once again there is some support for the hypothesis, as federal officials exhibit more agreement than either of their peer groups.

One of the least expensive and least intrusive of all hazard mitigation measures that can be taken is to conduct an educational campaign, enlightening the citizenry about the problem and eliciting their help to reduce the hazard. However, it must be kept in mind that the hypothesis under consideration at this point has nothing to do with *what* is being done (or not done), but the *level of awareness* of what is being done.

Federal respondents were very consistent in their awareness of educational programs at their level of government with 95% responding "Yes."

State officials split half "No" and half "Yes". To determine if this split is a result differences in states, or in knowledge level, responses were disaggregated by state. In seven states (Colorado, Montana, Arizona, Oregon, Florida, California, and Utah) and there was a consistent response, while five states (Washington, Michigan, South Dakota, Texas, and Arkansas) showed little agreement.

There was considerable agreement at the county level, with 60% indicating that their county had conducted educational campaigns. Disaggregation by county isolated 6 of 37 counties with considerable ambiguity about these programs.

There is some support for the hypothesis, in that federal officials are more consistent than county and state, but county respondents are more consistent than their state counterparts. This is a surprising result, since individuals interviewed at the state level were all personnel working within a state forestry agency.

Interviewee support of, and attitudes toward, educational campaigns also produced some surprises. Using measures of central tendencies it is clear that responses to this question are exactly opposite of what the hypothesis predicted. Federal officials were the least consistent, state personnel were intermediate, and returns from the county level were the most in agreement. However, it should be noted that the mean response from the entire group indicated strong support, making this a very popular mitigation measure indeed.

To probe the political leanings of government employees, three different methods of dealing with private property in the WUI were included in the questionnaire and the interviewees were asked to agree or disagree on a 1-5 scale, with 1 being "strongly in favor" and 5 being "strongly opposed". The first statement suggested that people should be free to choose

to live anywhere and to be individually responsible for the hazards associated with that place.

On this issue, state responses were the most negative with 88% marking either a "4" or a "5." At the federal level 72% marked a "4" or a "5." But from county officials, much less disagreement with this statement emerged with only 54% marking the same numbers. Measures of central tendencies indicated highest consistency among state respondents less at the federal, and the least from individuals in county government. Once again county officials were different from their counterparts in federal and state government. *In this case they are the most likely to leave homeowners and businesses located in the WUI to solve their own problems without government "protecting them from themselves".* The hypothesis is supported in a most important fashion as county officials are less likely to institute mitigation measures that "tread on the toes" of individual property owners' rights.

This dichotomy of attitudes toward control over private property rights between federal and state officials, on one hand, and county officials on the other, may once again reflect the nature of their positions. Nearly all of the federal and state respondents were career civil servants with less connection to the local community than those individuals who were interviewed at the county level, most of whom were either elected or appointed. Being elected or appointed to a position requires significant interaction with members of the

local community, and those who get elected must reflect the attitudes prevalent in the community. Most of the individuals surveyed were from rural counties which tend to be more conservative than their urban counterparts, and people there often tolerate less interference in their lives.

The second scenario is nearly diametrically opposed to the first one, in that it holds that government agencies should regulate the WUI heavily, prohibiting building and utilizing stringent building and zoning codes where construction is allowed. *Then* property owners would be responsible for their own insurance and fire fighting costs.

Responses to this statement were opposite to the previous one, with the mean being nearly two points lower, indicating strong agreement. Consistency among the three groups, as indicated by measures of central tendencies, were very similar. Of state respondents, 58% marking either a "2" or a "3", while County officials marked either a "2" or a "3" 54% of the time and their federal peers marked either a "1" or a "2" 59% of the time.

There is nothing here to support the hypothesis under examination, but it is worthwhile to note that *interviewees at all levels, but especially at the federal level, support the idea of increased governmental intrusion into private property owners activities much more strongly than they support the idea of leaving those property owners to be responsible for their own safety.* The explanation given above holds true

again. Civil servants who manage larger areas, and see a larger constituency than the local population are more likely to support increased regulation in rural areas.

The third statement upon which interviewees were asked to express their agreement involved the idea of making wildfire insurance mandatory and then letting the marketplace set the price according to the safety of the site. This is a mix of "heavy handed" government and libertarian ideas.

On this issue, once again there was a wide range of responses. Federal officials marked "3," "4," and "5" almost equally, state respondents checked "3" and "4" 58% of the time while their county peers selected "4" or "5" 56% of the time ("5" indicates strong opposition).

As above, there is nothing here to support the hypothesis that federal people will exhibit the most consistency. However, at another level, it is worth noting that county interviewees disagree most strongly with the statement, while their federal and state counterparts are more in agreement, supporting my earlier speculative statements.

Federal and state interviewees were also asked to identify the appropriate level of involvement in joint WUI hazard mitigation. Eighty-six percent of the federal officials agreed that the proper roll of a federal agency is "as a member of a joint program with state and local agencies." There is much more agreement from federal officials here than might be anticipated, given the ambiguity of some federal

responses and the inclination to dismiss the importance of responsibility of the county level of government. Recall that on many issues of responsibility, federal officials frequently indicated that the level of government that should be responsible for WUI issues should be either federal or state, rather than county government. This is just the opposite opinion expressed by most county officials and in this case, state responses frequently supported the county position.

This is contrasted with their state counterparts, of which 64% believed that the proper role of a state agency is "a lead agency in a joint program." This is rather strong agreement among state officials on this very important issue.

Federal officials were then asked about the establishment of uniform policies between federal agencies, or whether such policies exist now, and if they support this kind of inter-agency cooperation. Responses on the issue of uniformity of policies indicate very little agreement which seems to indicate that there was very little knowledge of this type of cooperation, nor had it been discussed much.

There is support for the concern of many that federal agencies tend to compete more than they cooperate with each other. There is also support for those who say that each National Forest or BLM Resource Area is run like a little fiefdom with insufficient coordination between separate units. Many subjective comments made by federal interviewees suggest this, as they were concerned that joint policies with other

federal agencies would not be flexible enough to deal with the unique conditions that exist in their jurisdiction.

State officials were queried concerning the establishment of statewide building codes and a state land use oversight agency--whether one existed, and support for the establishment of such an agency. Unlike their federal counterparts, state officials were knowledgeable of these issues and there was nearly complete agreement on the existence of statewide building codes (generally they were not) and whether officials wanted them (they did). There was much agreement on whether their state had any WUI site requirements. Similar responses occurred concerning a state land use oversight agency. Only two states had them and nearly everyone knew the status in their state. There was strong agreement among these individuals on this issue, as nearly everyone wanted one, the strongest support of any group for additional regulation. Even when state officials were asked about their willingness to increase taxes to collect money to help pay the cost of fire fighting in the WUI, they strongly approved. State officials were very consistent in their knowledge of state laws and regulations and in their desire for more regulation and taxes.

At the county level, there was strong support for the idea of instituting building codes and other regulations directly related to wildland/urban interface areas and that support was very consistent with 78% either checking "1" or "2" on a 1-5 scale with 1 being strong support. They wanted

these regulations to protect people and property and to reduce the fire hazard, with about 70% mentioning these items as the basis for their support.

County officials were also queried as to the effectiveness of Wildfire Hazard Mitigation Plans. They were first asked about the effectiveness of the plan for people living in the WUI and then about the effectiveness of the plan for people who want to buy or build in that area. Respondents were very consistent in their agreement on the first statement, with 75% agreeing. On the latter there was slightly less agreement but support was still quite strong at 65%. The difference between the consistency on the two ideas may reflect the belief among WUI officials that the major problem they have is people without information about the hazard moving into the WUI from cities . Since these people live beyond the WUI officials' jurisdiction, they will be hard to reach with any programs in advance of their moving into the county.

Getting to the heart of the matter, county interviewees were asked about the existence of a formal Wildfire Hazard Mitigation Plan in their county. Somewhat unsettling, county respondents in 12 (32%) of the counties exhibited serious ambiguity in their responses. On some issues 68% consistency is very good, but in the case of this very important question, 68% is quite weak and brings into question the claim that

nearly all of the individuals contacted are involved in the problem of the fire at the Wildland/Urban Interface.

County officials who responded that their county had a formal WHMP were asked how the program was instituted. Responses are not confidence inspiring. More individuals responded than on the lead-in question, an impossibility for those who can follow simple instructions. After first eliminating counties with ambiguous responses, and then disqualifying the counties that produced ambiguous answers, there were five counties that have definite programs, and three had some kind of program. Even being optimistic and saying that individuals from eight counties generally agreed that they have a formal plan and those from 17 counties generally agreed that they had no formal program, that still leaves 25 (65%) of the counties where officials' statements were very ambiguous. This is a disturbing lack of agreement. There is no way to put a good face on these responses. They simply indicate that even county officials who claim to be involved with WUI issues are not very involved. When individuals in 65% of the counties investigated, counties that are supposed to be some of the most susceptible to wildfire hazards, can not even agree whether their county has a formal wildfire program or not, then there is only one conclusion to be drawn. *This is not a big issue in those counties*.

There is some brightness in this overall murkiness--all but one of the individuals who reported that their county had

a Wildfire Hazard Mitigation Program followed-up by agreeing that those programs were active.

All county officials were then queried as to their attitude toward WHMPs and there was no ambiguity, as 78% indicated either "Strong Agreement" or "Agreement" on the importance of having such a plan. Perhaps this bodes change in the future.

The consistency of responses to the above items are summarized in Table 4-1. For full text of the question see the questionnaire included as Appendix 1, and analysis of most questions is included in Appendix 2.

When searching for consistency among the sub-groups on questions that were asked of all interviewees, only the results from question one produces full support to the hypothesis that federal interviewees would be the most consistent, state people less consistent, and county respondents the least consistent. On 38% of the issues there was a total lack of support, while partial agreement was found in 9 cases (56%). Looking at the totals from the table, federal and state officials demonstrate intra-group agreement an equal number of times (7 times or 44%). The hypothesis proposed that state respondents would be intermediate in consistency most often, but this situation occurs only 4 times (25%). The hypothesis also states that county respondents will be the least consistent of the three groups, but this occurs on only 7 questions (44%).

Table 4-1
Support for Hypothesis # 1, Common Questions

Question Number	Federal*	State	County	Hypothesis Support
1	21%	31%	15%	Partial
2a	67%	72%	51%	Partial
2b	84%	84%	70%	Partial
3	80%	70%	70%	Partial
4	100%	100%	100%	No
5	59%	52%	53%	Partial
6	81%	55%	50%	Partial
6b	67%	49%	52%	Partial
7a	54%	56%	61%	No
7b	19%	63%	34%	No
8	71%	57%	43%	Yes
13	95%	50%	60%	Partial
14a	Least	Int.	Most	No
F18,S22,C29	Int.	Most	Least	Partial
F19,S23,C30	Least	Most	Int.	No
F20,S24,C31	33%	58%	56%	No

* Consistency of agreement.

There is only weak support for the hypothesis from items in Table 4-1.

The search for intra-group agreement continued by investigating items that were only asked of individuals from a single level of government. The hypothesis remains the same. Federal data is summarized in Table 4-2; state in Table 4-3; and county in 4-4.

Table 4-2
Support for Hypothesis # 1, Unique Federal Questions

Question Number	Consistency	Hypo. Support
Federal Questions		
9	36% Don't Know	Weak
10a	Normal Dist.	None
10b	32% Top 2 Resp.	Weak
11	45% No; 36% Yes	Weak
12a	55% 1 or 2	Weak
15	86% Joint Prog.	Strong
16	57% Yes; 33% No	Strong
21	51% Active Favor	Weak

Table 4-3
Support for Hypothesis # 1, Unique State Questions

QUESTION NUMBER	CONSISTENCY	HYPO. SUPPORT
State Questions		
9	92% No	Strong
10a	80% Yes	Strong
10b	Wide Range	None
11	86% No	Strong
12a	71% 1 or 2	Strong
12b	Wide Range	None
16a	Normal Dist.	None
16b	Wide Range	None
18a	58% 1 or 2	Weak
18b	Wide Range	None
19	66% Lead/Joint	Strong

Table 4-4
Support for Hypothesis # 1, Unique County Questions

Question Number	Consistency	Hypo. Support
County Questions		
9	No Ambiguity	Strong
10a	78% 1 or 2	Strong
10b	69% top 2	Strong
12a	71% 1 or 2	Strong
12b	41% agree on 2	Weak
15a	Ambiguous	None
17	75% agreement	Strong
18	65% agreement	Strong
19a	68% agreement	Strong
19b	Ambiguous	None

The three tables reveal a total rejection of the hypothesis that there will be a lessening of consistency as the analysis of results moves from federal to state to county levels of government. County interviewees demonstrate 70% agreement; responses from state officials were in agreement only 45% of the time; while federal officials only mustered agreement 25% of the time.

In conclusion, support for the first hypothesis is lacking. Perusing tables 4-1 through 4-4 finds almost no support for the hypothesis.

Testing for Commonality Between Federal, State and County Officials

The assumption is that federal and state responses will be more similar than either those from federal and county, or from state and county. This is due to the fact that questionnaires were sent to federal and state individuals who *work with fire as a profession*, while county respondents represent individuals from a wide range of professions.

Concerning who is responsible for WUI problems, there are several levels of quality in the analysis. In three instances there is a statistical difference revealed by the SNK procedure, between the county responses and those of the other levels of government. In five others there are similarities, although those differences are not statistically significant. Therefore, the hypothesis is supported by these responses. In only two other variables, neither relating to any wildfire activities, was there a statistical difference. In both cases, state respondents saw the problem as less important than individuals at other levels of government. In the other variables, responses showed little difference.

On the follow-up open-ended query concerning the knowledge of other WUI problems, Chi-square tests indicate that there is a difference between county responses and others. Recall from the analysis of issues for the first objective that county responses are more varied than others. Now it is revealed that not only are they more varied, but there are

also fewer offerings. Once again, this probably reflects the wider job categories of county officials. It may also reflect the wide range of ages, education, and experience within this group.

The issue of who should be responsible for various problems in the WUI provides no support for the hypothesis that individuals working at the state and federal level will respond in a similar manner that is different from county respondents.

When interviewees were asked about the past occurrence of natural hazards in their jurisdiction there once again is little support for the hypothesis on most hazards. However, on two, droughts and wildfires--two hazards that frequently occur together and are central to this study--there is support for the hypothesis. On both of these issues *county officials reported fewer occurrences than either federal or state respondents*. This is almost certainly due to the broader range of problems that are dealt with at the county level. Looking back, wildfires would not stand out from other problems for county officials like they would for individuals (like those who were interviewed from state and federal government agencies) who are much more intensively involved in wildfire issues.

Probing further on the same issue, interviewees were asked to rate the probability of the same natural hazards occurring in the next ten years. The same two hazards,

wildfire and drought, arise to prominence with all three groups. But county officials believe the likelihood of an occurrence in the next ten years to be less than their counterparts in the other levels of government. *Clearly specific hazards do not stand out in the minds of county officials like they do with their resource oriented counterparts.*

When looking at the impact of wildfire hazard mitigation measures over the long run, county officials were much more likely to see these measures as causing problems in their jurisdiction. The strong support for the hypothesis here is not a surprise. County officials are much more likely to view the "big picture" and not just the WUI picture. Especially when counties are chronically short of operating capital, anything that might threaten economic development in the county will be viewed nervously by elected and appointed county officials.

On three philosophical issues; one suggesting that property owners should be left to their own devices to protect themselves; one suggesting that insurance should be made mandatory for WUI homeowners and then let the market set the value; and one suggesting stringent government controls over design and construction, the significant differences did not support this hypothesis. Generally federal respondents were the most liberal, state officials the most conservative, leaving those who worked for the counties in the middle.

Individuals were asked to indicate the position of various players on this issue and there are two ways of reviewing the responses. One criterium could be simply the knowledge of the position held by groups and individuals on this issue. Forty-five percent of the time county officials marked "Don't Know", more than the 39% of the time that state officials did, but less than the 48% of federal respondents. Obviously using this criterium, there is little difference in the responses. The other criterium involves whether the individual was involved in the issue or not. Ninety-four percent of federal officials were involved, 96% of their state peers, but only 76% of those at the county level. This supports the hypothesis, and that support is even more strongly stressed as 18% of the county officials failed to respond, a number far greater than federal (1%) and state (2%). One of the two criteria supports the hypothesis.

As can be gathered from Table 4-5 there is strong support for hypothesis # 2 five times (29%), weak support twice (12%), no support five times (29%) and no agreement between groups three times (18%). There is more support in the data for hypothesis # 2 than there is for hypothesis # 1, but it is not unqualified support.

Searching for Individual Differences

The assumption that individual federal decision makers have considerably more experience, are the most knowledgeable,

and have the greatest interest in the adoption of mitigation measures, with less exhibited at the state level and least from county officials was supported in some instances.

When asked whether they have lived in a home that was vulnerable to wildfire, federal respondents answered affirmatively more than either state or county, indicating some support for the hypothesis.

Table 4-5
Support for Hypothesis # 2, Common Questions

Question Number	Federal*	State	County	Hypothesis Support
1	Agree	Agree	Disagree	Strong
2a	Agree	Agree	Disagree	Strong
3	Wk Agree	Wk Agree	Wk Disagr	Weak
4a & 4c	Agree	Agree	Disagree	Strong
8a & 8b	Agree	Agree	Disagree	Strong
8g	Agree	Disagree	Agree	None
8 Other		No Agreement		
5		No Agreement		
6	Disagree	Disagree	Disagree	None
7a		No Agreement		
28a	Agree	Agree	Disagree	Strong
F18,S22,C29	Agree	Disagree	Agree	None
F19,S23,C30	Agree	Disagree	Agree	None
F21,S25,	Weak	Weak	Weak	
C26a	Agree	Agree	Disagree	Weak

* Consistency of agreement.

However, on the follow-up the situation changed, with state respondents having suffered the most, as 30% indicated

personal loss. Once again there is partial support for the hypothesis. It makes one wonder if more individuals at the federal level reported having lived in a wildfire vulnerable area because they are mostly foresters, who perhaps see their environment as being more threatening than others might view the same scene. Truly the query concerning actual loss rather than conjecture is the best indicator of personal threat from wildfire.

Gross involvement in the issue can be deduced from looking at the length of time an individual has held the same position. State officials have held their positions slightly longer than their federal counterparts, while county respondents had held their positions an average of 27% less time than their state counterparts and 25% less than federal. The hypothesis is partially supported here, with state and federal individuals both having held their jobs longer than county officials.

Probing the issue further and requesting what percentage of their time is allocated to WUI problems, state individuals indicated that they spend by far the most time, nearly 50%. Wildfire issues consumed 18% of federal officials' time, followed by their county peers at 12%. The hypothesis is supported partially in that both federal and state officials dedicate more time to this issue than do those working for the county. However, state employees spend far more time than federal respondents. It surfaces once again that the state

officials interviewed for this survey are the least diverse of any of the groups. They are foresters and fire fighters a majority of their time and their attitudes and responses repeatedly reflect that narrow focus.

At this point community involvement was investigated. This inclusion under objective # 3 may be debatable, but it remains because the results are so consistent. In all the following categories, including "Elected Office," "Appointed Department Head," Elected Civic Organization Officer," Elected Trade Union Officer," and "Elected Business Association Officer," a much higher percentage of county respondents have been involved. In all of the above categories state employees have had more experience than their federal counterparts, although not at a statistically significant level. Only in the category of "Elected Conservation Organization Officer" do state respondents lead the way. In this case the situation shows them to have the most experience, followed by federal respondents and finally county people. However, the differences are slight.

These responses do not support the hypothesis at all. What they reveal, is that *county employees are more closely connected with the community than either their state or federal counterparts*. County responses in the survey consistently indicate local involvement.

When interviewees were asked to indicate what they considered to have been their major or predominant job or

occupation their responses support the hypothesis in that 46% of the federal respondents indicated that their careers had been in either fire management or fire suppression. Forty-two percent of state people reported the same, but only 18% of county employees indicated fire as their career.

This is another clear indicator of the difference in perspective between federal, state, and local officials on this issue. Individuals working in the two higher levels of government spend almost half of their time living fire problems, while county officials average less than one day each week.

When education levels of the three groups is viewed from a broad perspective, federal and state officials are nearly equal, but both are significantly higher than the level of county respondents. However, when this information is perused carefully, it is found that 20% of county officials hold a masters degree, which is much higher than individuals from either of the other two levels of government (federal=12%; state=6%) The county responses present a tremendously more varied work force than either of the others, even including three individuals with law degrees. This situation must indicate a much broader range of views on *any* issue that arises. The hypothesis is partially supported, with *federal and state officials being, on average, better educated than county people*, but the first two groups show little difference between them.

Delving into attitudes toward WUI problems, state officials indicated the most concern on "Increased Wildfire Potential" followed by their federal peers, with county respondents significantly less concerned. The same results occurred with responses on the issue of "Fire Protection for Homes". The hypothesis is partially supported by the responses on these wildfire issues, with both state and federal people being more concerned that county employees, but once again, there is little difference between federal and state responses.

On the follow-up, open-ended probe, federal and state responses were quite similar while their county peers were significantly different. In this case county respondents offered fewer "Other" problems that they felt were important, perhaps indicating either less knowledge of the issue, or just that they placed this issue at a lower priority level.

In none of the questions listed in Table 4-6 in the above table is the hypothesis fully supported. However, in 8 of 9 questions there is partial support, and there is a definite pattern. In 7 of 9 questions, county respondents are different from their federal and state peers, with lower mean education, less broad knowledge, and less involvement than their state and federal counterparts. What is presented is that in many instances there is not much difference between federal and state perspectives on this issue, while county respondents viewed the problem from a significantly different

perspective (often statistically significant at the 0.05 level).

Table 4-6
Support for Hypothesis # 3

Question Number	Federal	State	Country	Hypothesis Support
1	1	1	2	Partial
2a	1	1	2	Partial
32a	1*	2	2	Partial
32b	3	1	2	Partial
33b	1	1	2	Partial
33e	2	1	3	Partial
34	3	2	1	None
35	1	1	2	Partial
37	1	1	2	Partial

*Ranking

They are Different--But Not Always as Assumed

Objective 1

In sum, reviewing Tables 4-2, 4-3, and 4-4 there is little support for the first objective of this research as county officials are more in agreement in their responses to many questions than their federal and state counterparts, while the hypothesis states that federal officials will exhibit more uniformity in their responses than state respondents who will in turn exhibit more uniformity in their responses than individuals working at the county level. This is a little difficult to explain and is counterintuitive, as

federal officials are more educated, more narrowly defined by their job experience, and dedicate more of their time to the WUI fire issue than the county interviewees. It would seem reasonable that they would be more in agreement. *This finding demonstrates that having similar jobs, background, education and training will not necessarily produce people with similar views on an issue*. Perhaps the unique characteristics of the areas that they manage are a factor in this lack of agreement of responses.

Objective 2

The expectation for results of the analysis of answers to pertinent questions is that state and federal responses will be more closely aligned than either responses from federal and county and state and county. And this expectation is born out strongly half of the time, and on two other germane issues there is some support.

On some very critical wildland/urban interface issues, county officials differ in their responses from their peers at other levels of government. These issues, all germane to the problem include "Increased Wildfire Potential"; "Commercial Timber Adjacent to Homes"; "Fire Protection for Homes"; and "Planning". On all of them the county officials report less of a problem.

Remembering that the land in question is generally the same, whether the respondent is from federal, state, or county government (e.g. the federal and state jurisdictional areas

frequently include the county jurisdictions), it is once again worthy of note that county officials report fewer problems with either droughts or wildfires in the last ten years. It is clear that *fires are not always fires*. Just like so much else in life, the perception of a fire being a problem is filtered through the respondents background, training, and orientation in life. Often where federal and state officials saw problem wildfires, individuals at the county level did not.

The same thing happened when they were asked whether drought and wildfire will be a problem in the future. *County officials see fewer problems in the future than either federal or state respondents*. This is significant once again. Nothing will happen at the county level if county officials don't see significant problems.

Following along this same line, county officials foresaw a more significant problem with wildfire hazard mitigation measures in the next 20 years than did either of the other two subgroups. County officials identified a less significant hazard and a more significant problem with mitigation measures in the future.

The differences in these responses are germane to the question of whether something will be done to address the issue of fire.

Objective 3

Support for the idea that federal officials will have the most experience, be more knowledgeable, and have the greatest interest in mitigation measures with state foresters having less of all three and county employees having the least is supported to some degree on all of the issues tested except one. What really arises most strongly once again is that there is little difference between the federal and state respondents, but a great difference between them and their county peers.

Federal and state officials have held their positions about the same amount of time with county people being 25% less. County officials allocate the least amount of time to the issue of wildfire. They are much more involved in local issues by holding elected offices, being department heads, being elected officers of civic organizations, of trade unions, and of business organizations much more often than either their federal or state counterparts.

County officials are less concerned about fire protection for homes and they see fewer 'other' problems with fire.

Can They Ever Get Along?

What is portrayed is a dichotomous group of professionals, as federal and state officials supplied similar responses on many issues, while county officials responses were significantly different on many issues. It is unlikely that

there will ever be a meeting of the minds on many of these issues. It is always difficult for officials involved in many issues to concentrate their resources upon one problem among many. It will take considerable effort of the part of federal and state officials to convince county officials in many of the counties involved in this survey that this issue is one that should supplant all others.

CHAPTER 5
THE GARBAGE CAN THEORY AND WILDFIRES

Why Some Counties Adopt Plans and Others Don't

Alesch and Petak have described Kingdon's model the best:

> The garbage can model holds that decisions are made only when four independent streams are brought together by circumstance or by skillful management. These streams are: (1) problems, (2) solutions, (3) actors, and (4) decision opportunities. (1986, p. 233-234)

In the case of wildfire at the wildland/urban interface, the *problem*, as defined by this study, is an increased wildfire hazard due to increased building construction in, and adjacent, to wildlands. The *solution* is a wildfire hazard mitigation plan. The *actors* are the county employees involved in coping with wildfire at the wildland/urban interface. *Decision opportunities* occur during the time period immediately following a wildfire occurrence in the wildland/urban interface. Thus, *specific attention was paid to those individuals that reported a wildfire problem since 1982.*

In an attempt to determine whether the underlying causes for the establishment of a Wildfire Hazard Mitigation Plan (WHMP) could be isolated, those counties with a functioning WHMP were compared to those counties that had no such plan. In

all cases, responses were selected from counties that had experienced problems from a wildfire since 1982.

It must be reiterated at this point that it is not always obvious from the responses to this survey whether a county has a Wildfire Hazard Mitigation Plan or not. Consequently criteria were established to determine which counties to include. Responses from county commissioners and planning administrators were chosen in most cases as they represent the highest level of county authority. Through this process eight counties were identified, while three more counties where the entire planning staff agreed that a WHMP existed were added later.

Is There a Problem?

To investigate whether the first stream of garbage is flowing, pertinent responses were analyzed to determine problem perception. (It should be noted once again, that a set of responses in tabular form has been included as Appendix 2.)

Decision makers were asked to rate the importance of fourteen problems that may occur in the wildland/urban interface. "Fire Protection for Homes" and "Increased Wildfire Potential" were rated as the two most important problems. However, as stated earlier, county respondents rated both of these problems as significantly less important than

either federal or state officials. Even given this weaker support from county officials, it is clear that within the realm of county rural land management, fire was viewed as the most important problem. However, the importance of "Planning" as a problem can not be ignored, as it ranked third out of 14 potential problems. These three issues could help a county official decide whether the issue of wildfire at the wildland-urban interface is a problem.

According to the model, problem recognition is essential for action on an issue. Even though all of the respondents rated "Fire Protection for Homes", "Increased Wildfire Potential", and "Planning" as serious problems, county officials rated all three problems lower than their federal and state counterparts. According to the model, these results would bode poorly for the initiation of a WHMP in many counties.

Table 5-1 presents the progression in significance of county responses. All county officials involved in the study indicated that these three problems were less important than reported by individuals from counties with a wildfire in the past ten years. And, individuals from counties with an implemented WHMP rated the problems as being more important than either of the other groups.

Narrowing the analysis and investigating responses only from counties with WHMP's and comparing the results with those from counties w/o such plans, it was found in all three cases

(Planning, Increased Wildfire Potential, and Fire Protection) counties with operating WHMP's found the problems to be greater, indicating that they would be more likely to address the problem.

Table 5-1
Rating of Seriousness of Wildland/Urban Interface Problems

Jurisd.	Fire Protection For Homes	Increased Wild-Fire Potential	Planning
Federal	8.75*	8.79	7.84
State	9.04	8.84	7.92
County	8.13	7.64	7.24
Counties W/wildfires	8.44	8.01	7.52
Counties W/O WHMP	8.40	7.96	7.40
Counties W/ WHMP	8.52	8.11	7.76

*In all cases this is a mean rating of the problem with a score of 1 being not at all important and a score of 10 being very important.

Whose problem Is It anyway?

When asked who should be primarily responsible for "Planning", in the wildland/urban interface, county and state respondents overwhelmingly agreed that this is a county matter. Federal officials were less sure and their responses were divided between state (23%), and county (65%).

On the issue of who should be most responsible for "Home Fire Protection" a more muddled pattern emerges, as 38% of county respondents delegated this duty to municipal govern-

ments, while 48% gave it to themselves, and 12% gave responsibility to state governments. *Over half of county respondents (52%) did not feel that protecting homes in the wildland/urban interface was primarily a county responsibility.*

Neither did state officials accept this problem as their own, dividing their delegation of primary responsibility between county (56%) and municipal (31%) governments. *It is clear that protecting homes from wildfire is not perceived as a state obligation by state respondents.*

Federal respondents were not in agreement on whose primary liability this problem is, *except that it was not theirs.* Thirty-one percent gave this problem to state governments, 43% passed it to the counties, and 24% delegated it to municipalities.

One of the basic tenets of the Garbage Can theory is that decision makers *must* identify a problem to be within their realm of authority. What emerges here is a consistent signal that *the majority of the people who responded to this survey (regardless of their level of government) did not accept that protecting homes from wildfire is within their purview.*

Disaggregating responses on this issue more finely by selecting those from counties that reported a problem with wildfire since 1982, and then comparing the responses from the counties with WHMPs to those from counties without such plans reveals that in counties with WHMPs, 91% of officials believed that it is their responsibility to plan in the WUI. By

contrast, in counties without WHMPs, only 77% gave themselves primary responsibility for this function, with a higher than expected percentage assigning this function to either state or municipality governments. Individuals in counties that have experienced a wildfire, but have not put together a WHMP were less likely to see this as something that they should address.

Officials who had reported that a wildfire(s) had occurred in their jurisdiction in the last ten years were asked about long-term consequences of the fire(s), and 45% indicated that there had been some long-term consequences. Responses were quite similar among the three sub-groups, with 40% of federal, 52% of state and 47% of county officials marking "Yes." When viewed from this perspective, it can be established that nearly half of the respondents whose counties had wildfire related problems in the last ten years recognized long term effects from the fire(s).

Delving deeper and comparing responses from counties with WHMPs and those without WHMPs an odd tendency emerges. Responses from the two sub-groups were exactly equal, at 46% "Yes", a finding which does not support the Kingdon model, as both groups regard the problem equally, as evidenced by their equal recognition of long-term negative effects of wildfires.

Interviewees were asked about whether there "were...any other long-term effects of that/those fire(s)" and almost as many (44%) who had originally indicated long-term effects in (45%), followed up by mentioning other long-term effects.

As done previously, responses were disaggregated into counties with WHMPs and those without. Unless otherwise noted, all analysis in this chapter only includes responses from counties that reported a problem with wildfire since 1982. Once again the results are counter-intuitive as individuals in counties without plans report slightly more (42% v. 36%) *other* long-term effects from the fires. Perhaps the responses given support the fourth stream of the model concerning a "window of opportunity" in that long term effects constitute a potential catalyst for action, but there is little support for the current stream concerning problem recognition.

When asked to rate the chances of a wildfire occurring in their jurisdiction in the next ten years, state officials rated it the highest, followed by federal, and finally county who still reported a quite substantial 77% chance. But when the examination was restricted to county officials from those counties that had a wildfire problem in the last ten years, the change was rather dramatic, with a jump to 84% probability rating. Respondents living in a county without a WHMP rated it a little less important at 83%, while those in counties with WHMPs rated it somewhat higher at 85%. The differences are not statistically significant and there is only slight overall support for the Kingdon model in the responses. However, unlike other responses associated with this stream,

there was no follow-up intensification of the differences at the WHMP/no WHMP level of analysis.

Personal knowledge (bias) of the issue was probed by asking if the respondent had ever lived in a home that was vulnerable to wildfire. Returns were again split about 50/50. But there is a sub-group difference as federal officials responded positively much more frequently than their state or county peers.

Again comparing the responses from counties with WHMPs to those without, a difference between the two groups is revealed as 56% of the officials who lived in counties with WHMPs owned homes that they felt were vulnerable to wildfire, while 40% of those in counties W/O WHMPs did not. The survey then took this personal involvement with the problem one step further by asking positively responding interviewees whether they had ever actually suffered a loss. Only 25 respondents (less than 7% of the individuals surveyed) had actually suffered (or had close friends or relatives suffer) losses. Half of them worked for county governments, but the figure dropped to under 6% in this group. Clearly personal losses is not an issue that will induce change.

Support for the first stream of "garbage" into the can, as evidenced by the above questions is tabulated in Table 5-2.

Some See Bigger Problems Than Others

It is a mixed bag on the first stream. With regard to the question "is there a problem?" there is much agreement that fire related issues are the most important issues facing interviewees. However, this must be qualified by noting that fewer county officials, who would be responsible for the institution of a Wildfire Hazard Mitigation Plan believe this to be a problem than their counterparts in state and federal government.

Table 5-2
Support for Stream # 1, Kingdon model

Question Number	State/ Federal Support	Counties With Fires	County w/ WHMP v. County w/o	Kingdon Model Support
1c, 1d, 1j	Strong	Strong	Strong	Yes
3	Weak	N/A	Strong	Yes
5	Strong	N/A	None	Some
7a	None	N/A	None	None
8	N/A	Strong	Weak	Some
32a	Some	N/A	Strong	Yes
32b	None	N/A	None	None

However, when responses from counties with WHMPs were compared to those without, the Garbage Can theory is supported. The trend is obvious: *the closer we get (within counties) to a WHMP the more seriously the problem is rated.*

Responses on this issue strongly support the theory, in that county officials living in counties where plans exist

felt that it is a county function to plan, while a smaller percentage in counties without WHMPs felt that way.

Over half of the respondents reporting problems with wildfires in their jurisdiction indicated that there were not any long-term effects from the fire(s). Since a Wildfire Hazard Mitigation Plan can only be considered a long-term solution to wildfire problems, support from this quarter seems lukewarm at best.

Over half of the total respondents reported no other long-term effects from the fire(s) in their county, once again failing to support the model.

County employees in counties without WHMPs and those in counties with WHMPs responded similarly to the issue of long-term problems relating to wildfires, which lends no support for the Garbage Can theory.

Some broad support for the theory arose from answers to question 8, but that support disappeared upon a narrowed analysis. Responses are about evenly split on question 32a. But in this case, a 50% positive response is more important that the same percentage in earlier questions. Personal involvement is a good motivator to increase interest in an issue, and 43% of county respondents indicated that they have previously, or are currently, living in a vulnerable setting. This large minority with personal involvement in the issue would be more likely to push for a Wildfire Hazard Mitigation Plan in their jurisdiction.

The idea that those with personal involvement would be more interested and that interest would translate into action with the establishment of a WHMP in their county was investigated at two levels. First, all respondents (federal, state and county) who reported vulnerability and who lived in counties with WHMP were compared to those who lived in counties without such plans. The results are dramatic. *Many more counties have WHMP where individuals have personal involvement with the hazard.*

Taking this matter to another level of analysis, and selecting for only county employees, the results came out similarly but with a lower significance level. There are more county respondents than expected who currently live or have lived in a home vulnerable to wildfire who also live in a county with a WHMP. This bears out the supposition that this issue is of more importance to people who have had personal experience with the hazard. Thus the Kingdon model is strongly supported by the responses on this issue.

However, following the same narrowing of analysis to county officials who had actually suffered property damage due to wildfire, there was no difference whether their county had a WHMP in place or not. Neither was the theory supported when the responses of individuals in counties with problem wildfires were disaggregated into those from counties with WHMPs and those without. However, it must be stressed that the

number of interviewees who responded affirmatively to this item is very small.

In conclusion, answers to questions 3, and 32a produced strong support for the Kingdon model; question 1 responses support it, answers to questions 5 and 7a weakly support it, while responses to question 32b are too few to draw any credible conclusions from. The results of the testing of the first stream all support the theory to a greater or lesser extent.

Are There Solutions?

The second stream of data to go into the garbage can includes *solutions*. Before an issue will be addressed it must be determined that there are solutions that fall within the bailiwick of the individuals and the governmental entity involved. There follows an analysis of responses that should shed some light on this issue of solutions.

Interviewees were asked whether past wildfires have resulted in new laws or regulations. Forty percent of responses were affirmative, which is not particularly significant. But reviewing the data more closely revealed that *half* of the county respondents indicated new laws or regulations as a result of the fire(s). With all of the issues that are dealt with in county government, having half of them involved in a particular matter may be enough to convince others in

county government (who are probably more indifferent than opposed to dealing with the issue) that there are solutions.

To test the model further, responses from counties with WHMPs were compared to those without. More individuals living in counties with WHMPs than expected (63%) reported policy changes after the problem fires. These responses contrast with those from individuals living in counties without WHMPs, 43% of whom reported changes. Support for the model is very strong, as half of the total county respondents reported public policy changes, while after restricting analysis to those from counties with WHMPs this rose an additional 13%.

The survey then attempted to identify what considerations might keep a WHMP from being adopted. Interviewees were offered a potpourri of potential hindrances. All levels of government agreed on the prioritization of the first three problems, with "Lack of funding" followed by "Lack of interest among property owners," and then "Lack of interest among politicians". There are indications that limited funding is most important, but it is significant that all three levels of government identify outsiders as exerting negative influence (through lack of interest) on the development of a WHMP. Also noteworthy is that federal and state respondents believe that county agencies bicker a lot, state agencies agree more, and federal agencies agree the most. The perception from inside the counties was different however, with intra-agency conflicts being regarded as equally

important at all three levels. This is a key difference, as individuals who do not see the problem as pertinent to their county government, but external to the extent that funding availability and outsiders control the destiny of WHMP development may believe there is no ready solution to the problem.

Isolating counties that had wildfire problems and then disaggregating the responses into those from counties with WHMPs and those from counties without them, reveals that those with WHMPs identified county conflicts as being less of a problem than respondents from counties without plans. This supports the Kingdon model for action or lack thereof, as it states that mitigating measures will only be taken when those decision makers involved visualize the problem as being solvable within their realm of activity.
(For a compilation of responses to question 27 see Tables 5-3 and 5-4.)

Whether "Inter-agency Conflicts" would hinder adoption, goes the same direction but less strongly. Individuals from WHMP counties rated it as less important than those from non-WHMP counties. Once again those from counties without WHMPs identified an obstacle hindering the adoption of a WHMP more than those individuals from counties with such a plan.

The idea that "Federal Intra-agency Conflicts" hinder adoption brought out similar results as the previous problem.

Table 5-3
Conflicts that May Hinder Adoption of a WHMP

Jurisd.	Inter Agency Conflicts	Federal Intra-Agency Conflicts	State Intra-Agency Conflicts	County Intra-Agency Conflicts
Federal	2.61*	3.20	2.76	2.46
State	2.92	3.45	3.16	2.78
County	2.74	3.09	2.93	2.94
County W/Fire	2.71	3.12	2.91	2.86
County W/O WHMP	2.66	2.99	2.74	2.82
County W/WHMP	2.79	3.38	3.23	2.94

*All ratings based upon the scale of 1-5 with "1" being very important and "5" being not at all important.

Fewer people from counties with WHMPs than expected found this to be a problem. Federal intra-agency conflicts were not perceived to be a large problem by either group.

When interviewees were asked whether "State Intra-agency Conflicts" would hinder adoption, fewer officials from counties with WHMPs than expected found this to be a problem, while it was more important for individuals living in counties without WHMPs. The Kingdon model is supported here.

Continuing investigation of various items in Table 5-4, analysis was restricted to responses from county officials from those counties where past wildfire problems were reported. Responses were then compared between counties with WHMPs to those without such plans. Responses to "Lack of Funding" varied the most as fewer respondents than expected from counties with WHMP identified a lack of funding as a problem,

although respondents from both groups reported this as the most important problem.

Table 5-4
Problems that May Hinder Adoption of a WHMP

Jurisd.	Preexisting Laws	Lack of Funding	Low Politician Interest	Low Landowner Interest
Federal	2.42*	1.50	2.03	1.74
State	2.42	1.42	1.92	1.82
County	2.89	1.66	2.36	2.21
County W/Fire	2.80	1.64	2.31	2.10
County W/O WHMP	2.81	1.51	2.17	1.94
County W/WHMP	2.76	1.88	2.59	2.41

*All ratings based upon the scale of 1-5 with "1" being very important and "5" being not at all important.

When asked whether a "Lack of Interest Among Politicians" would hinder adoption of a WHMP, interviewees responded similarly, as those from counties with WHMPs identified this as less of a problem than those from counties without WHMPs. And even though the problem was rated as quite important by both groups, the difference between groups is quite large. Here is just another hindrance identified more strongly by those who have not implemented Wildfire Hazard Mitigation Plans over those who have.

"Lack of Interest among Property Owners" was rated quite high by all county officials from counties that reported wildfire problems since 1982, but the separation between the two groups was less (even though it follows the same pattern) as officials from counties with WHMPs rated it as less

important than the non-WHMP group, supporting Kingdon's model for action.

When asked whether "Pre-existing Laws and Regulations" would hinder the adoption of a WHMP, the responses rated about midway on the scale of importance, with those from counties with WHMPs indicating a slightly stronger problem rating, perhaps running contrary to what the Kingdon model suggests. However, it may also be possible that the promulgation of new laws and regulations is often hindered by existing laws and regulations that need to be eliminated or altered to provide consistency in the legal system. For a county that has gone through the process of WHMP establishment, dealing with pre-existing laws and regulations may have been a nightmare.

Analysis of the various potential hindrances to adoption of a WHMP produced results that all pointed in the same direction (exception made for "Pre-Existing Laws...") with respondents from counties that have already adopted WHMPs finding these problems to be less important than individuals from counties that have no plans. There are two separate inferences that can be drawn. Perhaps a plan was adopted because these hindrances to the solution (adoption of a WHMP) were exerting themselves less strongly. On the other hand, it could be inferred that the problems were only rated as less important because the officials in WHMP counties are looking backward, and have discovered that the negative influence of these problems was not as great as they had anticipated.

Interviewees were encouraged to speculate on the impact of wildfire hazard mitigation measures on future development in the WUI. This question was included to identify whether responses were different from the county respondents living in counties with WHMP from counties without such a plan. The only category that shows any difference is "Not a Problem". All nine respondents who feel that this issue is not a problem come from counties without WHMPs. But, it must be stressed that these are nine responses out of 147 (6%).

Knowledge of existence of building codes and site requirements was investigated to check whether responses are reasonable compared to the questions being asked. If the survey was collecting accurate responses, there should be a big difference between the responses from counties that have WHMP and those that don't when the question of existing building codes arises. The difference does exist: officials from 69% of those counties with WHMPs report new building codes in the WUI compared to 23% for those counties without such plans.

Respondents were queried about their attitudes toward increased building restriction in the WUI. According to Kingdon one of controls regulating whether a government will act is the recognition of a solution to be within its purview. WHMPs often contain provisions for fire resistant building construction. In general, county respondents strongly favored this type of control on building in the WUI, thus supporting

the Kingdon model in that if a solution is recognized, it usually favored action. Isolating those counties that had fires, the favorable rating rises considerably, and further disaggregating the responses, officials from counties that have established WHMPs favored this idea even more strongly. Non-WHMP county responses are predictable in that their favoring this restriction was less strong.

Interviewees were asked to rationalize their feelings about WUI specific building codes and site restrictions, and those from county government strongly concentrated their rationale into two categories, the "Government Should Protect People" and "Reduce the Fire Hazard". Federal responses were concentrated in two very different categories, "Federal Involvement Not Needed" and "More Government Not Necessary". State responses were too diverse to categorize. When the model is applied to responses given by federal officials it suggests *that there is not a solution within their scope of operation.* But concern here is with county responses and those replies indicate that indeed there is a solution--*we must protect people and reduce the fire hazard, and to do so we must institute controls on property owners.*

Isolating individuals from counties that reported past wildfire problems and then separating counties with WHMPs from those without, the numbers become rather small in most categories. But in the major one "Government Should Protect People" there is an obvious difference, as 45% (22/49) of the

respondents from counties with WHMPs indicated that this is the reason for increased regulation, while only 30% (30/100) of non-WHMP county officials responded in the same way. Once again those from counties with WHMPs favored more restriction.

Respondents from counties with WHMPs report much greater use (68%) of "..access design, fire breaks, etc." than those from non-WHMP counties (36%). This was simply a "reality check". If the results of analysis had been different from this, there would have been doubt cast upon other responses. But reality seems OK, as the results overwhelming support the obvious, that there are going to be more restrictions in counties with WHMPs in place.

The initiation of educational campaigns at the county level was included in this analysis because, unlike overt measures, educational campaigns are a less intrusive way of dealing with the problem. Sixty percent of all county responses were positive (compared to 95% of the federal and 50% of the state officials).

Analysis was then restricted to those counties that had reported past fire problems, and then subdivided into those counties with WHMPs and those without, and the difference is still dramatically obvious. Eighty-three percent of respondents from counties with WHMPs reported the use of educational campaigns compared to 64% of those from counties without WHMPs.

The issue of educational campaigns was investigated further and people were asked if they supported the institution of such campaigns in their counties.

Respondents overall strongly supported this idea, and county people supported it the strongest. A familiar pattern emerges once again when analysis is restricted to those counties that have had problem wildfires and disaggregating into responses from WHMP counties and those without, as those from counties with WHMPs supported educational campaigns more strongly than those from non-WHMP counties.

This is a strong statement in favor of Kingdon's model, as *even on the least intrusive of measures like educational campaigns, individuals from counties without WHMPs are less likely to be supporters of this mitigating measure than their colleagues from counties with WHMPs* (even though in this case, the difference is not great).

Respondents were then queried about "other" hazard reduction measures. Looking at responses from counties that had fire problems and then disaggregating into those with WHMPs and those without, shows that 58% of those with WHMPs have instituted other wildfire hazard mitigation measures while only 24% of those in counties without WHMPs have done so. Reality seems OK here once again.

Officials were asked whether they favored or opposed access designs, etc. to address the problem. There was strong

support for these controls, *but the strongest support is found among county respondents*.

Isolating counties that had fire problems and comparing those with WHMPs and those without reveals a familiar pattern. The two groups combined exhibit predictably stronger support than the entire pool of county respondents. Probing further, the same pattern as before is revealed, with those from counties with WHMPs exhibiting stronger support than those from counties without WHMPs. The realization that this is a solution to the problem becomes progressively more powerful in each group moving from the overall county population, to those with past fire problems, to those with WHMPs.

The survey then probed how many complaints about WHMPs infringement upon private property rights county respondents had heard. The findings are not intuitive. Including all county respondents in the analysis produced the following results: 39% had heard this complaint frequently, 41% once in a while, and 17% not at all. When the analysis was restricted to counties with past fire problems and then officials from counties with WHMPs were compared to those from counties without WHMPs the results indicate some deviation from the typical findings elsewhere. Thirty-six percent of the respondents from counties with WHMPs had heard this complaint frequently, while 40% of those in counties without WHMPs responded the same. One might expect that there would be more

complaining in counties with WHMPs in place, but this is not the case, although the difference is, once again, not great.

But, the number of respondents living *in counties with WHMPs* who reported that they had heard this complaint "once in a while" is, at 58%, dramatically higher, while those from other counties who reported having heard this complaint "once in a while" remained nearly stable at 41%. And to confuse the analyst even further, only 6% of those from counties with WHMPs reported having not heard the problem at all, while 15% of those from other counties reported having not heard this complaint at all.

What sense is to be made of all this? Perhaps individuals with preconceived ideas that WHMPs pose a problem (meaning those from counties that have had fires), but have not responded very strongly to the problem are more likely to remember hearing complaints. Officials in counties with WHMPs, where management of WUI restrictions is a day-to-day issue, have a small but constant interaction with homeowners and business people. This idea is further supported by the very small percentage of people in counties with WHMPs who have not heard this complaint at all. By accepting this argument, the Kingdon model is supported by these responses because it recognizes the issue but it is not seen as a deterrent to working on the problem of wildfire at the wildland/urban interface.

On the issue of whether an official thinks that a WHMP helps homeowners understand the problem better, 75% of all county respondents agreed that this is true. When the analysis was restricted to counties with past fire problems, the number of those who agreed that people have more understanding climbed to 86% and when responses from counties with WHMPs were compared to those without, the difference is substantial. Eighty-seven percent of those living in counties with WHMPs felt that these plans result in more understanding. This percentage drops to 72% among individuals from counties without WHMPs.

Officials were then asked whether people who want to buy or build in the WUI are more knowledgeable in counties with a WHMP and 65% of all county respondents agreed that they are more knowledgeable. The usual pattern emerged from the next level of analysis, with 68% of those from counties that had a fire problem believed that this is so. Following this now familiar pattern, there was 78% agreement from officials in counties with WHMPs, while from the counties without WHMPs that agreement dropped to 64%.

Several management scenarios were then proposed and officials asked to rate their support. Responses varied only slightly between counties with WHMPs and those without WHMPs. Both groups disagreed rather strongly with the issue; "People know the risks of living in the WUI and should bear the loss themselves" with very little difference between the two

groups. When given the statement " . . . The government should require wildfire insurance rather than fight wildfires in WUI" there was more disagreement with a rating that was more negative among individuals living in counties without a WHMP. But interestingly enough on the statement that " . . . government agencies should require wildfire resistant homes instead of fighting fires" officials from counties with WHMPs agreed more strongly than those from non-WHMP counties. Clearly the individuals who have produced a regulatory document believe in its power. Even though the response differences between the two county groups are small, the familiar trend continues.

Solution Recognition Varies

To search for support for the second stream of Kingdon's model, whether there is a solution available that falls within the realm of operation of the actors involved, analysis was performed on all applicable responses. Of the fourteen questions considered, responses to only one failed to support Kingdon's thesis that action is more likely to occur in situations where the actors visualize that the problem under consideration is within their realm of activity. Responses to one question supported the thesis slightly, seven (including 7 of 8 parts to question 27) supported the model, while responses to five questions strongly supported it. These

results show that the respondents to the survey questionnaire fit the pattern identified by Kingdon (Table 5-5).

Table 5-5
Support for Stream # 2; Kingdon Model

Question Number	State/Federal Support	Counties With Fires	County w/WHMP v. County w/o	Kingdon Model Support
6	Support	Strong	Strong	Yes
27	Support	N/A	Support	Yes
28b	None	N/A	None	None
9	N/A	Strong	Strong	Yes
10a	Support	Strong	Strong	Yes
10b	Support	Strong	Strong	Yes
11	N/A	Support	Strong	Yes
13	None	Strong	Strong	Yes
15a	N/A	Support	Strong	Yes
12a	Strong	Strong	Strong	Yes
14a	Strong	Strong	Strong	Yes
16	N/A	Support	Support	Weak
17	N/A	Support	Strong	Yes
18	N/A	Support	Support	Yes
29, 30, 31	N/A	N/A	Weak	Weak

Are There People Available to Address the Issue?

Kingdon's third stream requires individuals to be available to work on the problem. The questionnaire provides limited opportunity to test this stream.

Interviewees allocation of time to the issue of wildfire at the wildland/urban interface is a good place to begin searching for support for the third stream. Overall, county respondents allocated an average of 11% of their time to this issue. This compares to 18% among federal officials, and a

whopping 46% for individuals working at the state level. Concentrating on county officials who live in counties with fire histories, there is only a slight difference in the allocation of time between counties with WHMPs (14%) and those without (12%). However, in the county planning departments this differential increases greatly, as one might imagine. In counties that have WHMPs, people work on the issue more than in counties where no such plan exists.

Analysis of the importance of WUI problems was included in stream # 1, but I believe that from an oblique angle these responses are applicable here also. For people to become available to work on an issue requires, first of all, politicians who are interested in the problem. Why? Because politicians control how money is spent, and addressing wildfire at the wildland/urban interface requires money. As shown in Table 5-4, it is not clear that politicians are more interested in the issue in counties which had wildfire problems. It seems that there is little difference. However, disaggregating responses into two groups, one from counties with plans and one from those without, it is clear that politicians in counties with WHMPs are more interested than those in counties without WHMPs. This finding indirectly supports the idea that there are people available to work on the issue in counties with WHMPs. Landowner interest in the problem is also a key factor in determining county involvement in this issue. If there is interest, there will

be less resistance to a county government allocating money to the issue, and the early dedication of funds will most likely be for labor. Looking at Table 5-3b, it can be seen that landowners in counties with WHMPs are more interested. This lends oblique support for the idea that people are available to work on the issue in the counties with WHMPs.

Lack of funds is seen as a hindrance to instituting a WHMP by most of the interviewees. Money, it seems that it always comes down to money. If there are no funds, there will be no people to work on the issue. But once again from Table 5-3b, it seems that money is less of a problem (although still a very serious problem) for county governments than it is for either federal or state programs. In county governments with wildfire problems, that rating remains essentially stable. But at the third level of disaggregation there is quite a difference, as individuals in counties without WHMPs rated this problem as more important than those in counties with WHMPs. In fact, *those from counties with WHMPs rated this as a significantly lesser problem than any other group in the survey* (federal, state, counties without WHMPs, counties with WHMPs). This difference supports the idea that there are people available (using available funds as a surrogate measure) in counties with WHMPs, and that counties without WHMPs but with fire hazard are the least likely to have people available.

Interviewees were asked whether the establishment of a WHMP is unfair to the county officials who have to administer it. Certainly one way to determine if there are people available to address the problem is to ask county officials whether the management of such a program is fair to them. As alluded to earlier in this analysis, interviewees in many counties were not in agreement whether there is a WHMP in place or not in their county. Scrutinizing the responses poses a problem, but in this case it is advantageous. All of the responses used in this analysis came from counties with fire problems, and all responded that their county has a WHMP, although according to the criteria noted in Chapter four, only 66% of the respondents were actually in counties with WHMPs. This group of officials consists of some people from counties with WHMPs, and a smaller group who were working in counties that are obviously doing something, but it is doubtful that they have a WHMP.

Fifty-seven percent of the respondents from counties with WHMPs rated this item "Very Fair" to county officials who administer the plan. This rating drops to 44% among other respondents. This situation is reversed when looking at "Somewhat Fair" with officials from counties with WHMPs rating it 34% while others rate it at 56%. The difference between these two groups is not great, but it does trend in the direction of supporting Kingdon's thesis.

Counties W/WHMPs Are More Likely To Have People Available

Only responses to five questions were reviewed to search for support for stream # 3 but in all cases there is at least some support for the model. Frankly, there are few opportunities in this survey to test this assertion of Kingdon's model. However, the analysis of the few questions that are applicable to stream # 3 do supports the model (Table 5-6).

Table 5-6
Support for Stream # 3, Kingdon model

Question Number	State/ Federal Support	Counties With Fires	County w/WHMP v. County w/o	Kingdon Model Support
33a	N/A	None	Weak	Weak
27-7	Support	Weak	Strong	Yes
27-8	Support	Weak	Strong	Yes
27-6	Support	Support	Strong	Yes
24e	N/A	N/A	Weak	Weak

Was There a Decision Opportunity?

The fourth stream that must be poured into the "garbage can" is a "decision opportunity". In this study, the window of opportunity is the occurrence of a wildfire in the wildland/urban interface in the recent past. "Recent" has been arbitrarily defined as less than 10 years. Kingdon's model holds that even if all of the first three streams come together, no action is likely to occur if there is not some

catalyst for action. This stream is addressed almost exclusively by responses to one question in the survey.

Interviewees were asked about wildfire problems in their jurisdiction since 1982. Eighty-seven percent of the respondents indicated that a wildfire had been a problem in their jurisdiction in the past ten years. Since county respondents tended to have smaller jurisdictions than either federal or state officials, it is reasonable to find that fewer of them would report a wildfire, but even given that qualifier, 82% of county respondents reported problems with wildfire in the past ten years. The major issue is whether that/those wildfire(s) presented a window of opportunity for the establishment of a WHMP. Comparing individuals working in counties without WHMPs to those with, *there is no difference as 82% of both groups indicated that yes, there was a wildfire that caused problems in their counties in the last ten years.* The window, then, was open equally for all of these counties.

For a further check responses were analyzed to see if some counties had more than one fire during this period of time, and perhaps it could be argued that the "window of opportunity" had been opened wider in those counties with a larger number of fires. Of the counties that have WHMPs, CO-Summit, CO-Chaffee, and SD-Lawrence (33%) reported no wildfires. The other eight counties with plans averaged 2.4 fires during the period of interest. (It is worth noting that in only one county did respondents clearly remember a fire before

1984. Of the non-WHMP counties, seven (27%) had no wildfires, and the other 19 counties reported an average of 2.7 fires during this period of time. Once again, it is clear that the window of opportunity for action was opened just as wide for the counties that have WHMPs as it was for those without. Further the development of a WHMP was not related to a larger number of problem fires.

Everyone Had The Same Decision Opportunity

Both of the questions tested for this stream produced the same results--that there was no difference in the existence of a window of opportunity for the counties with WHMPs and those without. Eighty-two percent of both groups reported a wildfire problem in the last ten years. A third of the counties with WHMPs have not had a fire problem in the last ten years. Twenty-seven percent of the counties without a WHMP have not had a fire. There has been an average of 2.4 fires in counties with WHMPs and 2.7 in counties without plans, not a particularly significant difference. This is the only stream going into Kingdon's model that does not show differences between the two groups as it appears that an equal window of opportunity existed for both groups.

The "Garbage Can Model" and Its Application to This Study

Analysis has found support, often strong for the Kingdon model for action. Individuals working for counties that have WHMPs in place visualize wildfire at the wildland/urban interface as a problem that is within their realm of authority. Officials working in counties without WHMPs in place were less likely to see the problem as an issue that is theirs to act upon.

On the second stream concerning solutions to the problem, this study found once again that people working within counties with WHMPs were more likely to identify workable solutions to the problem than those working in counties without such plans in place. The third stream, whether there are actors to address the issue, was only tested lightly. Yet, in responses to the items that shed some light on the issue of whether there are people available to work on the problem, the same result surfaced as with the first two streams. Officials working in counties that have WHMPs indicated that there were people (or that there was a means of hiring people) to work on the issue, while such a belief was weaker among those who work in counties without implemented plans.

Finally, the window of opportunity was open equally for both groups.

It can be confidently concluded that more counties without wildfire hazard mitigation plans have not established them because the first three streams of input have not been positive to the application of such plans: a conducive environment is necessary to their implementation.

CHAPTER 6
CONCLUSIONS

Federal and State versus County Decision Makers

Motivation for this research came from a desire to understand why some counties with wildland/urban interface fire problems have responded with a wildfire hazard mitigation plan while other counties with similar fire occurrences have done little or nothing.

I proposed that this issue has not been addressed in many fire-prone areas because meso level officials (Palm 1990) are not in agreement on the problem. I therefore set out to search for the differences between the three levels of government officials (federal, state, and county) who are most responsible for dealing with the issue of wildfire at the wildland/urban interface. Palm suggested in her theoretical model that the hindrance to adoption of hazard mitigation measures may lie at the meso level.

I can not prove after having conducted this research that the solutions to the problems lie at the meso level. However, I have proven that meso-level officials are not an amorphous group of individuals. Data analysis frequently uncovered differences.

It was anticipated that federal officials would be a very unified group of people, due to their similar education and training and their strong sense of being in the "service." This was not so. Neither was it true at the state level, even though officials involved in this survey held very similar positions in the various states. Especially on the philosophical issues presented to them, these individuals were often just that--individuals. However, the trends that did appear were similar for federal and state officials.

County officials were the most unified of the three groups in their responses. Furthermore, on nearly all issues, responses from the county level of government were significantly different from the second group which contained federal and state responses. I would speculate that this is due to the nature of their positions, as most county interviewees held elected or appointed positions and were more likely to reflect the generally conservative attitudes prevalent in rural communities across America. It is clear that similar training and education does not translate into a similar view of the world.

Testing whether federal and state responses would be similar and county responses would be significantly different produced similar results to the items tested for the first objective. Federal and state officials are similar philosophically, as well as in training and education. County

responses were more uniform, yet quite different from their federal and state peers.

The trend that surfaces from the responses to these questions is that federal and state decision makers are much more in agreement on issues, and that both groups are in frequent disagreement with county officials. This dichotomy does not augur a good future for joint programs among the three groups, as there is significant disagreement on the issues. Perhaps the depth of this disagreement is best exemplified by the responses concerning the occurrence of wildfires in the last ten years that have caused problems in the respondents jurisdiction. Federal and state officials remembered more problem fires than their county peers. It must be stressed that the individuals involved in the survey (especially federal and county) are generally managing the same land in a broad sense of the term, as their jurisdictions usually overlap. This basic perceptual difference bodes poorly for joint programs addressing the issue, when the county officials *may not even remember a past wildfire occurrence as being an important issue*!

When asked to speculate on the likelihood of future problems with wildfire in their jurisdiction, this same dichotomy arose. State and federal officials saw fire problems in their future, while county officials did not. Once again, this is not a good sign if the goal is to

establish a joint program among the various levels of government to address the issue of wildfire.

"Who are these people, anyway?" is a basic question of this research. The third assumption tested was whether federal respondents are more narrowly defined than their state peers, who would be more narrowly defined than county officials. This assumption received little support.

However, what became quickly apparent was that federal and state officials were grouped together with their county peers being isolated as different. There is a clear dichotomy between federal and state respondents in one camp and county decision makers responses being very different.

A further interesting twist that surfaced concerned community involvement. State and federal respondents have had almost no community involvement, while many more county decision makers are (or have been) involved in community activities. Once again this finding does not shed a favorable light upon federal and state initiated hazard mitigation programs. County officials not only fail to see the problem as being as important, either in the past or in the future, but they are more connected with their communities and are more likely to reflect community attitudes toward the issue. It appears likely that the community, as reflected in the attitudes and experience of their elected and appointed leaders, does not identify this problem as being of critical

importance and thus they are not likely to give strong support for mitigation plans.

These findings tend to explain why Moore's (1981) specific "Proposed Standards" got nowhere. The very people who would be responsible for instituting his standards fail to view this issue as a particularly large problem. Furthermore, my research tends to supply a response to Hewitt (1983), where he suggests that current methods of dealing with hazards leads people to believe that government can be relied upon to solve problems. If the federal and state officials truly see the problem as being more serious than their county counterparts, they may very well (as many of them indicated to me) addressing these fires even though most of them view the problem as being a county one. Counties do not have to solve the problem because it is being dealt with by state and federal agencies.

This reliance by county officials upon someone else to deal with the WUI problem as suggested by Irwin (1987) and Davis (1990) may very well be changed if federal and state officials can locate where the philosophical, attitudinal, and behavioral differences lie between themselves and county officials. Especially Davis bemoans the lack of information on local people who must be involved before serious action will be taken. This research provides clues to where some of these differences lie.

The current research agrees with Rossi et al. (1982) who found that county officials are not very interested in natural

hazards. I believe that federal and state decision makers have their work cut out for them in convincing counties to act upon this issue.

Decision Makers in Counties with Plans versus Those From Counties Without Plans

Some clues as to what motivates some county officials to act upon this problem have been illuminated by this study's application of the Kingdon (1984) "Garbage Can" decision making model to the very specific issue of wildfire at the wildland/urban interface. This is the first time that the model has been applied to such a specific issue and the application has proven to be most successful. I am very pleased with the results of testing Kingdon's model on this data.

As described in Chapter 5, county interviewees from counties where past wildfire problems have been reported were separated into two groups, those from counties where Wildfire Hazard Mitigation Plans have been instituted and those from counties where this has not occurred.

Problem identification was first pursued. There is strong support for the model on this stream. Problem recognition is much stronger in counties with Wildfire Hazard Mitigation Plans. This suggests that somewhere along the line someone has convinced officials in these counties to address the issue. This gets back to Davis' lament. Perhaps more

in-depth investigation of these counties will reveal why they have chosen to act.

When testing for solution recognition, the same pattern emerges. Officials from counties with plans are more likely to recognize solutions than those from counties without plans. The same conclusion can be drawn here, that somehow, for some reason, these people have become more knowledgeable of the issue. This may explain why Jefferson County, Colorado acted to produce a plan (Groves 1988). The state of Colorado offered county decision makers a solution.

The current research contained only oblique views of whether people were available to work on the problem. But all analysis produced similar results. Counties with plans there were more likely to have people available than counties without plans. The instructions to federal and state officials are simple--identify sources of funding for people and plans are more likely to be adopted.

Finally, this research has debunked the idea that counties with Wildfire Hazard Mitigation Plans have been victims of more problem fires than counties without plans. This is a significant finding, indicating that the occurrence of a wildfire at the wildland/urban interface is not an important determinant for the establishment of a plan. This can not be stressed too strongly. It is the most obvious identifier that would separate counties with plans from those

without, but this research indicates that it simply is not a factor.

A Final Note

This research has isolated and analyzed differences between individuals functioning at the three levels of government. Identification of these differences should be of assistance as these individuals try to understand why their counterparts at another level of government view the issue of wildfire at the wildland/urban interface differently from themselves.

There is also abundant information extracted from the questionnaire analyzed in chapter 5 that was not directly connected to the points being addressed here. Appendix 2 contains the responses to most questions presented in tabular format. Those with a deeper interest in the results of this survey, can peruse that Appendix. This general information should also be of assistance to other researchers, and perhaps more importantly, to individuals working in the field on this issue. Simple things like the differences between federal, state, and county philosophies toward new construction in the interface are dealt with.

For researchers, this is a good, practical example of an application of the Kingdon (1984) model to a specific natural hazard. The model functioned admirably in identifying the

differences between those counties with WHMPs in place and those without such plans. The model that has been successful in situations ranging from Kingdon's qualitative research, through the broad analysis of Alesch and Petak (1988), to the more specific Mittler (1988) study of hurricanes, has been very applicable to the specific issue of wildfire at the wildland/urban interface.

APPENDIX 1
SURVEY QUESTIONNAIRE

WILDFIRE AT THE WILDLAND/URBAN INTERFACE

A Survey of Decision Makers

"Wildfire at the Wildland/Urban Interface" is a survey undertaken by the Department of Geography at the University of Florida.

We are contacting you to ask for your cooperation in a study of how decision makers at the federal, state and county levels of government are handling problems in the Wildland/Urban Interface or Intermix. You are being asked to participate because your position is one that could be important in the development or carrying out of public policies related to this issue.

The Department of Geography
3141 Turlington Hall
University of Florida
Gainesville, FL 32611-2036

Qestions Asked of All Interviewees

Throughout this questionnaire we will be referring to the Wildland/Urban Interface, or "WUI." To avoid confusion, the Wildland/Urban Interface is being defined as areas which still retain most of their natural character, including vegetation, but which also include human-built structures. All kinds of structures can be involved from rural homes on 20 acre plots to ski areas and rural subdivisions. The key is that the area still largely retains a wildland character, be it trees, oak scrub, chaparral or whatever.

Q-1. There are problems in the Wildland/Urban Interface related to the human activity there. Using demands upon funding and personnel as criteria, please give the following problems a score between 1 and 10, with a score of "1" indicating no importance at all and a score of "10" indicating a very important problem.

	PROBLEM	SCORE
a.	New Road Construction.....	____
b.	Road Maintenance.....	____
c.	Planning.....	____
d.	Fire Protection For Homes.....	____
e.	Electricity.....	____
f.	Soil Erosion.....	____
g.	Traffic Congestion.....	____
h.	School Busses on Poor Roads.....	____
i.	Competing Government Agencies.....	____
j.	Increased Wildfire Potential.....	____
k.	Zoning.....	____
l.	Commercial Timberland Adjacent to Homes.....	____
m.	Homeowner Demands for Urban Services.....	____
n.	Water Pollution.....	____

Q-2. Are there any other problems specifically related to the Wildland/Urban Interface that are important?

NO YES If "YES" what are these problems?

Q-3. Here is a list of WUI problems, please indicate which level of government--federal, state, county or smaller than county, would be primarily responsible for dealing with the problem and which should be secondarily responsible.

F = Federal S = State Co = County Mu = smaller than county

PROBLEM	PRIMARILY RESPONSIBLE	SECONDARILY RESPONSIBLE
a. New Road Construction.....	F S Co Mu	F S Co Mu
b. Road Maintenance.....	F S Co Mu	F S Co Mu
c. Planning.....	F S Co Mu	F S Co Mu
d. Fire Protection for Homes..	F S Co Mu	F S Co Mu
e. Soil Erosion.....	F S Co Mu	F S Co Mu
f. Zoning.....	F S Co Mu	F S Co Mu
g. Commercial Timberland Adjacent to Homes.....	F S Co Mu	F S Co Mu
h. Demand for Urban Services..	F S Co Mu	F S Co Mu
i. Water Pollution.....	F S Co Mu	F S Co Mu
j. Competing Demands for Water.....	F S Co Mu	F S Co Mu

Q-4. There are several natural hazards that can occur in the Wildland/Urban Interface--for example, droughts, floods, wildfires, severe snowfalls, mud slides and severe winds. Since 1982 have any of the following been a problem in your county?

	YES	NO	DON'T KNOW
a. Droughts	Y	N	DK
b. Floods	Y	N	DK
c. Wildfires	Y	N	DK
d. Severe snowfalls	Y	N	DK
e. Mud slides	Y	N	DK
f. Severe Winds	Y	N	DK
g. Earthquakes	Y	N	DK
h. Other (please specify)			
i. Other (please specify)			
j. Other (please specify)			
k. Other (please specify)			

If "c. Wildfires" was answered "YES", please continue on with question Q-5, page ?? and continue.

If "c. Wildfires" was answered "NO", please skip to question Q-8, page ?? and continue.

Q-5. For the wildfire(s) your jurisdiction experienced since 1982 were there any long term consequences for the county? For example, was the economy of any part of the county affected for more than a year?

YES If "YES", please fill in the table below.

NO If "NO", please go to question Q-6, and continue from there.

DON'T KNOW If you don't know, please go to question Q-8, page ?? and continue from there.

A. Do you recall the name/names of the fire(s)? LIST SEPARATELY	B. Please estimate when each fire occurred.	C. What were the lasting economic effects of each fire?

Q-6. Was there any change in local or state public policy as a result of the fire(s) that your county experienced wince 1982? For example--new regulations or a new regulatory entity?

YES If "YES", please fill in the form below.

NO If "NO", please go to question Q-7, and continue from there.

DON'T KNOW If you don't know, please go to question Q-7, page 6 and continue from there.

A. Which fire(s) was that? LIST SEPARATELY	B. What was the change or changes in local, state,or federal policy made as a result of the fire(s)?

Q-7. Still thinking of the fire(s) that have occurred in your county since 1985, were there any other long-term effects of that/those fire(s)?

YES If "YES", please fill in the form below.

NO If "NO", please go to question Q-8, and continue from there.

A. Which fire(s) was that? LIST SEPARATELY	B. What were the OTHER long-term effects of each fire?

Q-8. Thinking of the next ten years--on a scale from a 0% to a 100% chance, where would you place your jurisdiction's chance of experiencing any of the following serious disasters?

a. Drought.....	____%	e. Flood.....	____%
b. Wildfire.....	____%	f. Severe Snowfall.	____%
c. Mudslide.....	____%	g. Severe Winds....	____%
d. Earthquake...	____%	h. Other.....	____%

Still another measure some counties [states][federal agencies] have taken is to conduct educational campaigns informing property owners of the actions they can take to reduce the wildfire hazard on their property.

Q-13. As far as you know, has your county conducted any such educational campaigns?

YES NO DON'T KNOW

Q-14. A. Using a scale of 1-5, with a score of "1" being strongly in favor and a score of "5" being strongly opposed--what is your opinion of such a campaign in your county [state][federal agency] that informs property owners of the actions they can take to reduce the wildfire on hazard on their property in the WUI?

STRONGLY IN FAVOR STRONGLY OPPOSED

1 2 3 4 5

B. Why do you feel that way?

C26, S25, F24G. Are there specific individuals whom you consider to be "shakers and movers" on the issue of Wildfire at the Wildfire/Urban Interface?

NO YES If "YES" who are they?

Within your jurisdiction?_____

Beyond your Jurisdiction?_____

C27, S26, F22. Lets assume that you favor Wildfire Hazard Mitigation Measures in your county [state][federal agency]. Listed below are some factors that could hinder the adoption of such measures.

Based on a scale of 1-5, with a score of "1" indicating that a factor is very important and a score of "5" indicating that a factor is not at all important, please indicate how important a factor would be in hindering adoption of Wildfire Hazard Mitigation Measures.

1. Interagency Conflicts or "Turf Battles"...1 2 3 4 5
2. Federal Intra-Agency Conflicts.....1 2 3 4 5
3. State Intra-Agency Conflicts.....1 2 3 4 5
4. County Intra-Agency Conflicts.....1 2 3 4 5
5. Pre-Existing Laws and Regulations.....1 2 3 4 5
6. Lack of Funding.....1 2 3 4 5
7. Lack of Interest Among Politicians.....1 2 3 4 5
8. Lack of Interest Among Property Owners....1 2 3 4 5
9. Other (Specify).....1 2 3 4 5
10. Other (Specify).....1 2 3 4 5

C28, S21, F17. A. In the long run, lets say over the next twenty years, how much effect do you think Wildfire Hazard Mitigation Measures will have on development and construction in the Wildland/Urban Interface in your [county] [state] [jurisdiction]?

Please use the scale below from 1-5 with a score of "1" indicating a strong effect and a score of "5" indicating no effect at all upon development and construction in the Wildland/Urban Interface in your [county] [state] [jurisdiction].

STRONG EFFECT			NO EFFECT	
1	2	3	4	5

B. Why do you feel that way?

Now we would like to know what you think government agencies should do in regard to Wildfire at the Wildland/Urban Interface. Of course almost everyone agrees on some things--for example, when a wildfire starts, and there are lives in danger, everything possible should be done to save those lives. On other issues, however there is quite a bit of disagreement.

Some argue that families and businesses know the risks they are taking when they build or live in the Wildland/Urban Interface. Since people undertake these risks willingly, then it is their responsibility to bear the losses they might suffer when wildfire occurs. According to this view, government agencies should not consider protection of buildings in the WUI a problem to be addressed.

C29, S22, F18. A. Using a scale from 1-5 with a score of "1" indicating strong agreement and a score of "5" indicating strong disagreement, how do you stand on the above statement?

AGREE STRONGLY				DISAGREE STRONGLY
1	2	3	4	5

Still another controversial viewpoint is that government agencies should develop stricter land use controls and building standards to reduce risks from wildfire at the WUI. According to this view, in the most wildfire prone areas, the government should prohibit development. In less wildfire prone areas, the government should require that homesites and businesses be wildfire resistant. The argument is that government agencies require these kinds of measures rather than spending money to fight structure fires and aid in reconstruction.

C30, S23, F19. A. Using a scale from 1-5 with a score of "1" indicating strong agreement and a score of "5" indicating strong disagreement, how do you stand on the above statement?

AGREE STRONGLY				DISAGREE STRONGLY
1	2	3	4	5

A third view is that the government should make compulsory some form of wildfire insurance by requiring insurance coverage on all homes in wildfire hazard areas. Government agencies would then no longer pursue the development of Wildfire Hazard Mitigation Programs, relying instead on insurance companies to establish wildfire resistant criteria and pricing insurance accordingly.

C31, S24, F20. A. Using a scale from 1-5 with a score of "1" indicating strong agreement and a score of "5" indicating strong disagreement, how do you stand on the above statement?

AGREE STRONGLY DISAGREE STRONGLY

1 2 3 4 5

1

C32, S26, F23. For this study, we are interviewing a variety of federal, state, and county decision makers involved in Wildfire at the Wildland/Urban Interface. For some of these people, dealing with this issue is their full-time job, while for others, working on this issue is only a portion of their job. How about you---

A. What is the exact title of your position?
B. How many years have you held this position?
C. What do you actually do in this job? (i.e. what are some of your main duties)
D. is this position ELECTED APPOINTED CIVIL SERVICE
E. What percent of your time do you allocate to problems associated with the wildland/urban interface?
F. What is the area of your jurisdiction, e.g. the entire county [state], half the county [state], etc. [federal--Ranger District, etc.]

C34, S29, F25. Not including the position you already told me about, have you ever held any of the following positions?

A. Elected Office?.....YES NO
B. Appointed head of department of government, federal, state, or county?.....YES NO
C. Elected officer of civic association?..YES NO
D. Elected officer of trade union?.....YES NO
E. Elected officer of business or professional association?.....YES NO
F. Elected officer of conservation organization?.....YES NO

C35, S30, F26. Looking back over your entire work experience and job history, what would you say has been your major or predominant job or occupation?

Finally, a few questions about your background.

C36, S31, F26. In what year were you born_____?

C37, S32, F27. What is the highest degree or diploma you presently hold?

DID NOT COMPLETE HIGH SCHOOL.....1
HIGH SCHOOL GRADUATE OR GED.....2
ASSOCIATE'S DEGREE.....3
BA OR BS COLLEGE DEGREE.....4
LAW SCHOOL DEGREE.....5
MA OR MS DEGREE.....6
DOCTORAL DEGREE (MD, ED.D., PH.D).....7

C38, S33, F28. If you have had any other training that you feel is pertinent to the issue of wildfire at the wildland/urban interface, please briefly describe the training.

C39, S34, F29. How many years have you lived in your current State of residence?

C40, S35, F30. How many years have you lived in your current County of residence?

Questions Asked Only of County Interviewees

Now we are interested in discussing wildfire hazard mitigation measures that could be taken in advance that would tend to lower potential damage and injury from the wildfire hazard in the Wildland/Urban Interface.

County Q-9. A measure that some counties have taken is to enact building codes that require buildings in wildfire prone areas to have fire resistant roofing, siding, and other construction techniques that reduce the fire hazard to structures.

As far as you know, has your county enacted any such regulations?

YES NO DON'T KNOW

County Q-10. A. Using a scale from 1-5 with a score of "1" indicating strong agreement and a score of "5" indicating strong disagreement, what is your opinion of county building codes in your county that would require buildings in wildfire prone areas to be built with construction techniques that reduce the fire hazard to structures?

AGREE STRONGLY DISAGREE STRONGLY

1 2 3 4 5

B. Why do you feel this way?

County Q-11. Separate from building codes, some counties have instituted regulations that dictate access design, cleared areas or fire resistant vegetation buffers, minimum water availability, underground power lines, etc. in an attempt to reduce the wildfire hazard in the WUI.

As far as you know, has your county enacted any such regulations?

YES NO DON'T KNOW

County Q-12. A. Using a scale from 1-5 with a score of "1" indicating strong agreement and a score of "5" indicating strong disagreement, what is your opinion of having county regulations in your county that dictate access design to reduce the wildfire hazard in the WUI?

STRONGLY IN FAVOR				STRONGLY OPPOSED
1	2	3	4	5

B. Why do you feel this way?

County Q-15. Has your county instituted any other hazard mitigation measures to reduce the wildfire hazard in the WUI?

YES If "YES," please go to part "B"

NO If "NO," please go to question Q-16 and continue.

DON'T KNOW If you don't know, please go to question Q-16 and continue.

B. What other hazard mitigation measures has your county taken? Please list all that you can think of.

County Q-16. One criticism that has been made of Wildfire Hazard Mitigation Programs has been that these programs infringe upon property owners rights to do as they please on their own private property. Have you heard this criticism in your county frequently, once in a while, or not at all?

HEARD FREQUENTLY NOT AT ALL

ONCE IN A WHILE DON'T KNOW

County Q-17. The defenders of Wildfire Hazard Mitigation Programs say that the programs have a number of good points. For example---

Homeowners who live in wildfire hazard areas now understand the problem better and are more likely to do things that will reduce the hazard. Do you agree with this statement?

AGREE DISAGREE DON'T KNOW

County Q-18. People who want to buy or build a home in the Wildland/Urban Interface are more conscious of the problem where wildfire hazard mitigation programs exist. Do you agree or disagree with this statement?

AGREE DISAGREE DON'T KNOW

County Q-19. A. Some counties have no formal Wildfire Hazard Mitigation Program and others do. Would you say that your county has a formal program?

YES If "YES," please go to part "B"

NO If "NO," please go to question Q-21, below and continue.

B. Did your county institute a formal program on its own or was it invited to participate in a joint program with others including federal or state agencies, or other counties?

COUNTY INITIATED JOINT PROGRAM DON'T KNOW

County Q-20. Would you categorize the formal program in your county as being ACTIVE or NOT ACTIVE at this time?

ACTIVE NOT ACTIVE DON'T KNOW

County Q-21. A. There is some debate about the need for Wildfire Hazard Mitigation Plans at all. Using a scale from 1-5 with a score of "1" indicating strong agreement and a score of "5" indicating strong opposition, what is your opinion of Wildfire Hazard Mitigation Plans?

AGREE STRONGLY DISAGREE STRONGLY

1 2 3 4 5

B. Why do you feel that way?

IF YOU ANSWERED QUESTION Q-20 "ACTIVE" PLEASE CONTINUE WITH QUESTION Q-22.

IF YOU ANSWERED QUESTION Q-20 "NOT ACTIVE" OR "DON'T KNOW" PLEASE GO TO QUESTION Q-26.

County Q-22. Earlier you mentioned that your county has an active Wildfire Hazard Mitigation Program.

Some counties have had good experiences with Wildfire Hazard Mitigation Programs and others have had some problems. Below is a list of some of the problems counties have had with WUI programs. Please indicate whether or not your county has ever had that problem with its Wildfire Hazard Mitigation Program: if "YES," how serious was that problem.

Has a problem with a Wildfire Mitigation Program in this county ever been that...		How serious has each problem ever been in this community--VERY SERIOUS, SOMEWHAT SERIOUS, or NOT SERIOUS at all?			
1. Property values have fallen.	YES NO DK	VS	SWS	NS	DK
2. Ongoing development projects had to be abandoned.	YES NO DK	VS	SWS	NS	DK
3. Incomplete and inaccurate maps?	YES NO DK	VS	SWS	NS	DK
4. Homeowners have not bee interested?	YES NO DK	VS	SWS	NS	DK
5. Program administration is a burden to the community?	YES NO DK	VS	SWS	NS	DK
6. Interagency confusion has hindered implementation?	YES NO DK	VS	SWS	NS	DK
7. Homeowners have complained about the program?	YES NO DK	VS	SWS	NS	DK
8. Many appeals and requests have been made for variances?	YES NO DK	VS	SWS	NS	DK

County Q-23. A. Aside from the problems we have just discussed, have there been any other problems with the Wildfire Hazard Mitigation Program in your county?

YES If "YES," Please go to part "B"

NO If "No," Please go to question Q-24 and continue.

DON'T KNOW If you don't know, please go to question Q-24 and continue.

B. What were these problems?

County Q-24. In your opinion does the Wildfire Hazard Mitigation Program in your county appear to be VERY FAIR, SOMEWHAT FAIR, SOMEWHAT UNFAIR, or VERY UNFAIR to each of the following groups?

A. Homeowners who live in WUI areas.	VF	SF	SUF	VUF	[illegible]
B. Persons who own undeveloped land in WUI areas.	VF	SF	SUF	VUF	[illegible]
C. Commercial recreation areas.	VF	SF	SUF	VUF	[illegible]
D. Subdivision developers in WUI areas.	VF	SF	SUF	VUF	[illegible]
E. County officials who administer the plan.	VF	SF	SUF	VUF	[illegible]
F. OTHERS (PLEASE SPECIFY)	VF	SF	SUF	VUF	[illegible]

County Q-25. A. Thinking back to the time before your county started participating in the Wildfire Hazard Mitigation Program, to your knowledge did your county have any restrictions or other regulations concerning construction and development in the WUI specifically designed to reduce the fire hazard?

YES If "YES," please go to part "B"

NO If "NO," please go to question Q-26 and continue.

DON'T KNOW If you don't know, please go to question Q-26 and continue.

B. What restrictions or regulations concerning development were in place?

County Q-26. A. Counties differ in how local regulations are proposed, enacted, or turned down. We are interested in what happens in your county with proposals for Wildfire Hazard Mitigation Measures.

Below is a list of persons and groups that sometimes get involved in such matters at the county level. Looking at each of the persons or groups on the list, please indicate whether each is ACTIVE AND FAVORS; ACTIVE AND OPPOSES; or is NOT ACTIVE in county wildfire hazard laws and regulations.

1.	Chief Executive	AF	AO	NA	DK
2.	Civil Defense Director	AF	AO	NA	DK
3.	County Commission	AF	AO	NA	DK
4.	County Planning Department	AF	AO	NA	DK
5.	Local Real Estate Board	AF	AO	NA	DK
6.	National Inholders Assn.	AF	AO	NA	DK
7.	Major Land Developers	AF	AO	NA	DK
8.	Construction Firms	AF	AO	NA	DK
9.	Local Newspapers	AF	AO	NA	DK
10.	Chamber of Commerce	AF	AO	NA	DK
11.	Roofing Industry	AF	AO	NA	DK
12.	Local TV and Radio	AF	AO	NA	DK
13.	Conservation Groups	AF	AO	NA	DK
14.	Fire Department	AF	AO	NA	DK
15.	People living in the WUI	AF	AO	NA	DK
16.	Your Agency	AF	AO	NA	DK
17.	Individual Homeowners	AF	AO	NA	DK
18.	Yourself	AF	AO	NA	DK
19.	Other (Specify)	AF	AO	NA	DK

QUESTION ASKED OF ONLY FEDERAL AND STATE INTERVIEWEES

State Q-19; Federal Q-15. There are various roles that can be occupied by state [federal] agencies in the problem of wildfire at the WUI. Do you feel that the proper role for a state [federal] agency is as a lead agency in a joint program with federal [state] and county agencies; or as a member of a joint program with federal and county agencies; or pursue an independent course; or should not be involved in the issue at all?

LEAD AGENCY JOINT PROGRAM	MEMBER AGENCY JOINT PROGRAM	DON'T KNOW
INDEPENDENT PROGRAM	NONINVOLVEMENT	

Questions Asked Only of State Interviewees

Now we would like to know what you think of Wildfire Hazard Mitigation Measures that could be taken in advance that would tend to lower potential damage and injury from the wildfire hazard in the Wildland/Urban Interface.

State Q-9. A measure that some states have taken is to enact statewide building codes that require buildings in wildfire prone areas to have fire resistant roofing, siding, and construction techniques that reduce the fire hazard to structures.

As far as you know, has your state enacted such legislation?

YES NO DON'T KNOW

State Q-10. A. Using a scale from 1-5 with a score of "1" indicating strong agreement and a score of "5" indicating strong disagreement, what is your opinion of statewide building codes in your state that would require buildings in wildfire prone areas to be built with construction techniques that reduce the fire hazard to structures?

AGREE STRONGLY DISAGREE STRONGLY

1 2 3 4 5

B. Why do you feel this way?

State Q-11. Separate from building codes, some states have passed legislation that dictates access design, cleared areas or fire resistant vegetation buffers, minimum water availability, underground power lines, etc. in an attempt to reduce the wildfire hazard in the WUI.

As far as you know, has your state enacted any such regulations?

YES NO DON'T KNOW

State Q-12. A. Using a scale from 1-5 with a score of "1" indicating strong agreement and a score of "5" indicating strong disagreement, what is your opinion of having new statewide legislation that dictate access design to reduce the wildfire hazard in the WUI?

STRONGLY IN FAVOR				STRONGLY OPPOSED
1	2	3	4	5

B. Why do you feel this way?

A measure that some states have instituted to control development has been the creation of a state land use oversight agency. This agency makes suggestions to local land use planning agencies and reserves final judgement on the appropriateness of plans produced at the county level.

State Q-15. As far as you know, has your state created such a land use oversight agency?

YES NO DON'T KNOW

State Q-16. A. Using a scale from 1-5 with a score of "1" being strongly in favor and a score of "5" indicating strong opposition, what is your opinion of the creation of a state land use oversight agency in your state?

STRONGLY IN FAVOR				STRONGLY OPPOSED
1	2	3	4	5

B. Why do you feel that way?

State Q-17. IN some states a special state excise tax has been levied on property in wildfire susceptible areas to help pay the cost of fire-fighting in those areas.

As far as you know has your state instituted such a tax?

YES NO DON'T KNOW

State Q-18. A. Using a scale from 1-5 with a score of "1" being strongly in favor and a score of "5" indicating strong opposition, what is your opinion of a state excise tax to help pay the cost of fire-fighting in the WUI in your state?

STRONGLY IN FAVOR			STRONGLY OPPOSED	
1	2	3	4	5

B. Why do you feel that way?

State Q-25. A. States differ in how legislation and regulations are proposed, enacted, or turned down. We are interested in what happens in your state with proposals for Wildfire Hazard Mitigation Measures.

Below is a list of persons and groups that sometimes get involved in such matters at the state level. Looking at each of the persons or groups on the list, please indicate whether each is ACTIVE AND FAVORS; ACTIVE AND OPPOSES; or is NOT ACTIVE in county wildfire hazard laws and regulations.

1. Governor	AF	AO	NA	DK
2. Individual State Representatives	AF	AO	NA	DK
3. Individual State Senators	AF	AO	NA	DK
4. Civil Defense Director	AF	AO	NA	DK
5. USDA Forest Service	AF	AO	NA	DK
6. USDI Bureau of Land Mgmt.	AF	AO	NA	DK
7. State Planning Agency	AF	AO	NA	DK
8. Conservation Groups	AF	AO	NA	DK
9. Local Officials	AF	AO	NA	DK
10. State Fire Fighters Assn.	AF	AO	NA	DK
11. National Inholders Assn.	AF	AO	NA	DK
12. Insurance Firms	AF	AO	NA	DK
13. Rural Homeowners Assn.	AF	AO	NA	DK
14. State Emergency Mgmt. Assn.	AF	AO	NA	DK
15. State Forestry Assn	AF	AO	NA	DK
16. Wood Products Industry	AF	AO	NA	DK
17. NFPA	AF	AO	NA	DK
18. Yourself	AF	AO	NA	DK
19. Other (Specify)	AF	AO	NA	DK

Questions Asked Only of Federal Interviwees

Now we would like to know what you think of Wildfire Hazard Mitigation Measures that could be taken in advance that would tend to lower potential damage and injury from the wildfire hazard in the Wildland/Urban Interface.

Federal Q-9. The Federal Government is involved in issues of wildfire hazard in the WUI. As far as you know, have any new federal laws or regulations specifically addressing this issue appeared since 1982?

YES NO DON'T KNOW

Federal Q-10. A. Using a scale from 1-5 with a score of "1" indicating strong agreement and a score of "5" indicating strong disagreement, what is your opinion of new federal regulations or laws to deal with this issue?

AGREE STRONGLY DISAGREE STRONGLY

1 2 3 4 5

B. Why do you feel this way?

Federal Q-11. It has been proposed that standardizing federal agency actions regarding the WUI would be a positive step in addressing the problem. As far as you know, are there now any standardized policies among federal agencies?

YES If "YES," pleas go to part "B" below

NO If "NO," please go to Question Q-12 and continue

DON'T KNOW If you don't know, please go to Question Q-12 and continue.

B. Which standardized policies are you aware of?

Federal Q-12. A. Using a scale from 1-5 with a score of "1" indicating strong agreement and a score of "5" indicating strong disagreement, what is your opinion of standardizing federal agency action regarding the WUI?

STRONGLY IN FAVOR				STRONGLY OPPOSED
1	2	3	4	5

B. Why do you feel this way?

Federal Q-13. Some federal agencies are involved in educational campaigns directly informing property owners in the Wildland/Urban Interface of things they can do to reduce the wildfire hazard on their property.

Which federal agency educational campaigns, if any, are you aware of that directly inform property owners?

1. FEDERAL EMERGENCY MANAGEMENT AGENCY

2. USDA FOREST SERVICE

3. NATIONAL FIRE PROTECTION ASSOCIATION

4. USDI BUREAU OF LAND MANAGEMENT

5. OTHER_____

6. NOT AWARE OF ANY FEDERAL INFORMATION CAMPAIGNS

People working within federal agencies are motivated to favor or oppose an issue for various reasons. Below is a list of persons and groups that sometimes get involved in WUI issues. Looking at each of the persons or groups on the list, please indicate whether each is ACTIVE AND FAVORS; ACTIVE AND OPPOSES; or is NOT ACTIVE in county wildfire hazard laws and regulations.

1.	Your Own Agency	AF	AO	NA	DK
2.	USDA Forest Service	AF	AO	NA	DK
3.	USDI Bureau of Land Mgmt.	AF	AO	NA	DK
4.	Boise Interagency Fire Center	AF	AO	NA	DK
5.	FEMA	AF	AO	NA	DK
6.	State DNR/Forestry	AF	AO	NA	DK
7.	State Planning Agency	AF	AO	NA	DK
8.	State Emergency Mgmt. Agency	AF	AO	NA	DK
9.	County Planning Agency	AF	AO	NA	DK
10.	County Emergency Mgmt.	AF	AO	NA	DK
11.	County Fire Fighting Assn.	AF	AO	NA	DK
12.	County Commissions	AF	AO	NA	DK
13.	Conservation Groups	AF	AO	NA	DK
14.	Civil Defense Director	AF	AO	NA	DK
15.	Red Cross Director	AF	AO	NA	DK
16.	Wood Products Industry	AF	AO	NA	DK
17.	NFPA	AF	AO	NA	DK
18.	Homeowners Association	AF	AO	NA	DK
19.	Yourself	AF	AO	NA	DK
20.	Other (Specify)	AF	AO	NA	DK

APPENDIX 2
QUESTIONNAIRE RESPONSE COMPILATION AND ANALYSIS

General Procedure

Questionnaire responses were coded and the Statistical Package for the Social Sciences (SPSS VAX version) was used for statistical testing. To expound the main tendencies of the data, descriptive statistics were generated for each question in the survey.

For categorical questions, Pearson's χ^2 tests were run, and if statistically significant differences emerged the parameters were narrowed and the tests run again to identify exactly where the difference lay. For scaling questions, analysis of variance (ANOVA) tests were run and if significance levels indicated differences, one-way analysis of subgroup means variance utilizing Student-Newman-Keuls procedure were calculated.

When identifying the uniformity of responses within a subgroup standard deviation (SD) was assessed first, with a smaller SD indicating more uniformity of responses and larger SD indicating disparity. However, since SD is highly affected by small numbers of responses widely deviated from the mean, Kurtosis (K), a measure of "peakedness" was also examined. A strongly positive K indicates a narrow range of responses

while a strongly negative K indicates a wide range of responses. Of course, when K=0 the distribution is normal.

Specific Results

In the following pages a compilation and a summary of the statistical examination of most questions included in this survey are presented in tabular format. This has been done for anyone seeking background information about the questions that were used to test the hypotheses of this research.

Specific Questions

"There are problems in the Wildland/Urban Interface related to the human activity there. Using demands upon funding and personnel as criteria, please give the following problems a score between 1 and 10, with a score of '1' indicating no importance at all and a score of '10' indicating a very important problem".
Question 1.

Responses to Question 1

PROBLEM*	MEAN ALL RESPONSE	MEAN FED.	MEAN STATE	MEAN CNTY.	ANOVA SIG. F
Inc. Wldfr. Potent	8.18	8.79	8.84	7.64	.000
Comm. Timber	5.76	6.78	6.31	5.00	.000
Soil Erosion	4.89	4.79	3.52	5.30	.001
Water Pollution	5.12	5.27	4.06	5.45	.004
School Busses	4.52	4.06	3.49	5.07	.009
Fire Protection	8.46	8.75	9.04	8.13	.044
Planning	7.52	7.84	7.92	7.24	.065
Road Maintenance	5.76	5.39	5.47	6.05	.066
Traffic Congestion	4.73	5.03	5.22	4.42	.071
Competing Agencies	4.27	3.85	4.08	4.56	.072
New Roads	5.67	5.33	5.88	5.82	.301
Electricity	3.96	4.21	3.73	3.87	.420
Zoning	6.41	6.48	6.86	6.25	.371
Homeowner Demands	6.35	6.32	6.06	6.44	.653
AVE. TOTAL MEANS	5.83	5.92	5.75	5.80	

*For full problem title see questionnaire in Appendix 1.

"Are there any other problems specifically related to the Wildland/Urban Interface that are important". Question 2-a.

(TABLE ON FOLLOWING PAGE)

Responses to Question 2a

	FEDERAL	STATE	COUNTY	TOTAL
YES	78	36	103	217
NO	22	6	60	88
TOTALS	100	44	163	305

Pearson's χ^2; Overall DF=2; Sig. F=.003
Federal v. County DF=1; Sig. F=.012
State v. County DF=1; Sig. F=.005
Federal v. State; DF=1; Sig. F=.291

"If 'Yes' what are these problems?"

Question 2-b.

Responses to Question 2b

PROBLEM	FEDERAL	STATE	COUNTY	TOTAL
Private Citizen	33	8	24	65
Administrative	16	12	28	56
Resource Management	15	11	10	36
Private Property	4	5	9	18
Other Problems	8	1	17	26
TOTALS	76	37	88	201

Pearson's χ^2; Overall DF=8; Sig. F=.009

"Here is a list of WUI problems, please indicate which level of government--federal, state, county, or smaller than county, should be primarily responsible for dealing with the problem and which should be secondarily responsible".
Question 3.

(TABLE ON FOLLOWING PAGE)

Responses to Question 3

"PROBLEM" disaggregated by "JURISDICTION" of respondents	PRIMARILY RESPONSIBLE+				SECONDARILY RESPONSIBLE+			
	F	S	C	Mu	F	S	C	Mu
Planning	11	53	258	19	17	105	89	87
Federal	10	25	72	3	7	42	30	20
State (.000)*	0	7	39	3	3	20	11	12
County [.081]**	1	20	147	13	7	43	48	55
Home Fire Protection	6	63	1	112	21	88	113	79
Federal	3	34	63	26	14	32	36	18
State (.002)	0	6	47	15	0	16	18	15
County [.003]	3	23	27	71	7	40	59	46
			89					
Road Maintenance	15	48	242	31	25	90	97	100
Federal	8	10	86	7	14	30	21	34
State (.005)	0	3	42	3	0	15	11	21
County [.002]	7	35	114	21	10	45	65	45
Zoning	3	24	294	25	8	92	73	137
Federal	3	10	92	3	2	41	19	36
State (.018)	0	2	46	2	0	16	7	22
County [.010]	0	12	156	20	6	35	47	79
Commercial Timber	103	143	77	13	54	129	101	27
Federal	40	48	13	5	23	39	36	4
State (.024)	10	24	11	3	9	21	14	2
County [.090]	53	71	53	5	22	69	51	21
New Road Construction	21	69	216	30	24	105	106	77
Federal	8	18	78	7	13	36	30	24
State (.047)	1	7	38	2	1	18	11	17
County [.039]	12	44	100	21	10	51	65	36
Demand for Urb. Serv.	3	26	236	78	7	74	106	124
Federal	2	14	70	23	2	31	35	32
State (.137)	0	1	35	14	1	8	15	20
County [.451]	1	11	131	41	4	35	56	72
Soil Erosion	72	129	122	15	44	126	113	31
Federal	26	40	32	6	10	44	36	7
State (.415)	5	21	21	2	8	16	16	5
County [.726]	41	68	69	7	26	66	61	19
Water Pollution	55	196	76	16	55	113	134	18
Federal	23	58	23	5	18	41	37	5
State (.509)	4	29	14	2	12	11	20	6
County [.088]	28	109	29	9	25	61	77	7
Competing Dem. Water	31	207	83	21	48	87	148	37
Federal	12	69	21	6	22	25	46	10
State (.801)	3	31	13	3	6	13	24	5
County [.481]	16	107	49	12	20	49	78	22

\+ F=Federal; S=State; C=County; Mu=Smaller than county
* ( )= Pearson's χ^2 Sig. F of "Primarily Responsible"
** [ ]= Pearson's χ^2 Sig. F of "Secondarily Responsible"

"There are several natural hazards that can occur in the Wildland/Urban Interface--for example, droughts, floods, wildfires, severe snowfalls, mud slides, and severe winds. Since 1982 have any of the following been a problem in your jurisdiction"? Question 4.

Responses to Question 4

NATURAL HAZARD		FEDERAL	STATE	COUNTY	TOTAL
Droughts:	YES	103	49	159	311
	NO (.003)*	11	0	33	44
Wildfires:	YES	106	48	164	318
	NO (.009)*	10	2	35	47
Severe Winds:	YES	75	37	123	235
	NO (.139)*	38	9	65	112
Severe Snowfalls:	YES	42	15	82	139
	NO (.464)*	69	29	109	207
Earth-quakes:	YES	4	2	12	18
	NO (.551)*	108	42	175	325
Floods:	YES	59	27	112	198
	NO (.536)*	53	20	77	150
Mud Slides:	YES	33	11	50	94
	NO (.773)*	77	33	136	246
Total Responses:	Droughts 355; Floods=348; Wildfires=365; Severe Snowfalls=346; Mud Slides=340; Severe Winds=347; Earthquakes=343.				

* ( )=Pearson's χ^2 Sig. F

"For the wildfire(s) that your jurisdiction has experienced since 1982 were there any long-term consequences? For example, was the economy of any part of the area affected for more than a year?" Question 5.

Only respondents who had marked "Wildfires" "Yes" in Question 4 were asked this question.

Responses to Question 5

	FEDERAL	STATE	COUNTY	TOTAL
Yes	42	24	73	139
No	62	22	83	167
TOTALS	104	46	156	306

"Please estimate when each fire occurred." Question 5-b.

(TABLE ON FOLLOWING PAGE)

Responses to Question 5b

STATE AND COUNTY	NO. OF REFERENCES TO FIRE*	YEARS IN WHICH FIRES OCCURRED
MT-Lewis & Clark	18	84, 88, 90
OR-Deschutes	16	87, 89, 90
SD-Pennington	6	85, 88, 90, 91
WA-Spokane	15	87, 91
CA-Santa Barbara	15	85, 88, 90
SD-Custer	15	85, 88, 90, 91
WA-Okanogan	14	82, 85, 87, 91
OR-Jackson	14	87
MT-Flathead	12	84, 88
MT-Missoula	11	85, 88
OR-Douglas	10	87
FL-Flagler	10	85
WA-Chelan	9	86, 88, 90, 91
FL-Charlotte	9	83, 85, 89
UT-Utah	9	87, 88, 89, 90
CA-Plumas	8	84, 87, 88
CO-Jefferson	8	88, 89, 90, 91
AZ-Gila	7	90
CO-Boulder	7	88, 89, 90
MI-Crawford	6	85, 90, 91
MI-Delta	5	86, 88, 90
CA-El Dorado	3	84, 88, 90
UT-Davis	3	87, 88, 90
UT-Weber	3	88, 89, 90
MI-Ogemaw	2	89
AZ-Yavapai	2	90
TX-Denton	1	91

*No respondents reported fires in ten counties: FL-Sarasota, WA-Kittitas, CO-Summit, CO-Chaffee, SD-Lawrence, TX-Bexar, TX-Harris, AR-Saline, AR-Garland, AR-Pulaski.

"What were the lasting economic effects of each fire?"
Question 5-c:

Responses to Question 5c

LONG-TERM ECONOMIC EFFECT	FEDERAL	STATE	COUNTY	TOTAL RESPONSE
Lost Timber Revenue	26	27	45	98
Loss of Homes	12	19	39	70
Altered Prop. Values	8	3	18	29
Floods and Erosion	8	4	16	28
Inc. Public Debt	7	8	12	27
Loss of Wildlife	3	0	9	12
Loss of Recreation	3	3	4	10
Loss of Rangeland	3	4	0	7
Inc. Timber Revenue	4	0	3	7
Additional Regulation	2	0	4	6
Subdivision Growth	0	0	3	3
Other	11	7	19	37
TOTALS	87	75	172	334*

*Includes all mentions of the categories of effects listed, regardless of which fire they represent.

"Was there any change in local or state public policy as a result of the fire(s) that your jurisdiction experienced since 1982? For example, new legislation or a new government policy?" Question 6-a.

(The federal questionnaire differs slightly in that it states "change in federal agency policy..." instead of "change in local or state public policy..." Only respondents who marked "Wildfires" "Yes" in Question 4 were asked this question.

Responses to Question 6a

	FEDERAL	STATE	COUNTY	TOTAL
Yes	17	24	69	110
No	71	20	68	159
TOTALS	88	44	137	269

Pearson's χ^2; Overall DF=2; Sig. F=.009
Federal v. County DF=1; Sig. F=.000
Federal v. State; DF=1; Sig. F=.000

"What was the change or changes in local, state, or federal policy made as a result of the fire(s)?" Question 6-b.

Responses to Question 6b

GOVERNMENT POLICY CHANGE	FEDERAL	STATE	COUNTY	TOTAL RESPONSE
Increased Regulation	10	13	39	62 (31.6%)
More Interagency Cooperation	8	10	25	43 (21.9%)
Potential Inc. Regulation	0	5	8	13 (6.6%)
More Training and Equipment	3	7	9	19 (9.7%)
More Public Education	0	3	14	17 (8.7%)
More Planning	1	3	3	7 (3.6%)
Other	5	6	24	35 (17.9%)
TOTALS	27	47	122	196

"Still thinking of the fire(s) that have occurred in your jurisdiction since 1982, are there any **OTHER** long-term effects of that/those fire(s)?" Question 7a.

Responses to Question 7a

RESPONSE	FEDERAL	STATE	COUNTY	TOTAL RESPONSES
Yes	46	21	52	119
No	53	22	83	154
TOTALS	99	39	135	273

"What are the **OTHER** long-term effects of that/those fire(s)?" Question 7b.

Responses to Question 7b

LONG-TERM EFFECT	FEDERAL	STATE	COUNTY	TOTAL RESPONSE
Environmental Problems	10	7	14	31 (17.6%)
Increased Public Awareness	2	13	14	29 (16.5%)
Lost Timber Revenue	8	2	9	19 (10.8%)
Improved Agency Cooperation	6	3	7	16 (9.1%)
Loss of Wildlife	2	0	9	11 (6.3%)
Loss of Recreation	4	2	5	11 (6.3%)
Improved Emergency Services	0	1	6	7 (4.0%)
Loss of Public Confidence	3	2	2	7 (4.0%)
Personal Loss	4	0	3	7 (4.0%)
Interagency Bickering	2	0	1	3 (1.7%)
Public Debt	0	0	2	2 (1.1%)
Other Effects (Wide Range)	22	2	9	33 (18.8%)
TOTALS	63	32	81	176

"Thinking of the next ten years--on a scale from a 0% to a 100% chance, where would place your area of jurisdiction's chance of experiencing any of the following serious disasters?" Question 8:

Responses to Question 8

NATURAL HAZARD		FEDERAL	STATE	COUNTY	MEAN**
Wildfire:	(.000)*	86.10	90.40	76.53	81.46
Drought:	(.014)*	71.52	77.28	65.31	68.91
Severe Wind:	(.059)*	51.98	66.52	55.72	56.03
Severe Snow:	(.905)*	44.53	42.61	42.94	43.40
Flood:	(.009)*	35.14	50.34	43.21	41.72
Mudslide:	(.976)*	23.01	24.09	23.51	23.43
Earthquake:	(.805)*	14.48	16.87	15.65	15.45
Total responses:	Drought=358; Wildfire 364; Mudslide 350; Earthquake 348; Flood 356; Severe Snow 349; Severe Wind 349.				

* ( )=ANOVA Sig. F
** Probability of occurrence (%)

"A measure that some counties have taken is to enact building codes that require buildings in wildfire prone areas to have fire resistant roofing, siding, and other construction techniques that reduce the fire hazard to structures. As far as you know, has your county enacted any such regulations?" Question 9 County.

Responses to Question 9, County Level

STATE AND COUNTY	YES	NO	DON'T KNOW	TOTAL
WA-Okanogan	0	4	2	6
WA-Spokane	1	6	0	7
WA-Chelan	4	3	0	7
WA-Kittitas	3	0	0	3
MI-Delta	1	5	0	6
MI-Crawford	1	5	0	6
MI-Ogemaw	1	5	0	6
CO-Jefferson	1	4	0	5
CO-Summit	7	0	0	7
CO-Boulder	4	0	1	5
CO-Chaffee	0	7	0	7
MT-Lewis & Clark	1	5	0	6
MT-Flathead	0	5	0	5
MT-Missoula	0	5	0	5
AZ-Yavapai	3	3	0	6
AZ-Gila	0	2	0	2
OR-Jackson	5	1	0	6
OR-Douglas	1	2	2	5
OR-Deschutes	3	3	0	6
FL-Charlotte	0	4	2	6
FL-Sarasota	1	0	2	3
Fl-Flagler	3	5	1	9

Responses to Question 9, County (continued)

STATE AND COUNTY	YES	NO	DON'T KNOW	TOTAL
SD-Pennington	0	6	0	6
SD-Lawrence	2	4	1	7
SD-Custer	1	2	0	3
CA-Santa Barbara	8	0	0	8
CA-Plumas	6	0	0	6
CA-El Dorado	5	1	0	6
TX-Bexar	0	5	1	6
TX-Harris	0	2	0	2
AR-Saline	0	4	0	4
AR-Pulaski	0	4	0	4
AR-Garland	0	4	0	4
UT-Utah	1	1	0	2
UT-Davis	1	3	1	5
UT-Weber	0	7	1	8
TOTALS	64	117	14	195

"A measure that some states have taken is to enact statewide building codes that require buildings in wildfire prone areas to have fire resistant roofing, siding, and construction techniques that reduce the fire hazard to structures. As far as you know, has your state enacted any such legislation?" Question 9 State.

Responses to Question 9, State

STATE	YES	NO	DON'T KNOW	TOTAL
Washington	0	7	0	7
Michigan	0	4	0	4
Colorado	0	5	0	5
Montana	0	5	0	5
Arizona	0	1	0	1
Oregon	2	2	0	4
Florida	0	5	0	5
South Dakota	0	4	0	4
California	2	0	0	2
Texas	0	6	0	6
Arkansas	0	2	0	2
Utah	0	4	0	4
TOTALS	4	45	0	49

"The federal government is involved in issues of wildfire hazard in the WUI. As far as you know, have any new federal laws or regulations specifically addressing this issue appeared since 1982?" Question 9 Federal.

(TABLE ON FOLLOWING PAGE)

Responses to Question 9, Federal

STATE AND COUNTY	YES	NO	DON'T KNOW	TOTAL
WA-Okanogan	0	2	2	4
WA-Spokane	0	1	0	1
WA-Chelan	1	2	0	3
WA-Kittitas	0	2	1	3
MI-Delta	0	3	0	3
MI-Crawford	0	0	0	0
MI-Ogemaw	0	1	1	2
CO-Jefferson	0	0	1	1
CO-Summit	0	2	0	2
CO-Boulder	0	0	0	0
CO-Chaffee	0	0	3	3
MT-Lewis & Clark	1	2	1	4
MT-Flathead	3	3	0	6
MT-Missoula	2	2	2	6
AZ-Yavapai	0	4	1	5
AZ-Gila	1	4	2	7
OR-Jackson	1	5	2	8
OR-Douglas	0	6	2	8
OR-Deschutes	0	4	1	5
FL-Charlotte	0	0	0	0
FL-Sarasota	0	0	0	0
Fl-Flagler	0	0	0	0
SD-Pennington	1	1	1	3
SD-Lawrence	0	1	0	1
SD-Custer	1	0	1	2
CA-Santa Barbara	1	2	1	4
CA-Plumas	0	7	3	10

Responses to Question 9, Federal (continued)

STATE AND COUNTY	YES	NO	DON'T KNOW	TOTAL
CA-El Dorado	1	4	3	8
TX-Bexar	0	0	0	0
TX-Harris	0	0	0	0
AR-Saline	0	1	2	3
AR-Pulaski	0	0	0	0
AR-Garland	1	1	1	3
UT-Utah	0	1	3	4
UT-Davis	0	1	1	2
UT-Weber	0	1	1	2
TOTALS	14	63	36	113

"Do you favor or oppose new regulations and/or laws dealing with this issue at your level of jurisdiction?" Question 10a.

Responses to Question 10a

	FEDERAL	STATE	COUNTY	TOTAL
Count	104	49	196	349
Mean*	2.88	1.76	1.83	2.13
Standard Deviation	1.48	1.01	1.21	1.36
Kurtosis	-1.39	.143	1.05	-.541
Skewness	.018	1.15	1.44	.886
Standard Error	.145	.144	.087	.073
F=25.759 ANOVA Significant F=.000 DF = 2				

* A score of 1 = strongly favors; 5 = strongly opposed

"Why do you feel that way?" Question 10 b.

Responses to Question 10b

RESPONSE	COUNTY	STATE	FEDERAL	TOTAL
Government Should Protect People	58	5	8	71
Federal Involvement Not Needed	0	0	38	38
Reduce the Fire Hazard	29	3	3	35
Past Experience	17	6	0	23
More Government Not Necessary	9	3	10	22
Local Gov't Don't Respond	0	5	9	14
Homeowners Must Act	5	4	2	11
Must Mitigate Hazard	0	7	4	11
Economic Savings	9	1	0	10
Gov't Should Educate	6	2	1	9
Need Federal Leadership	0	0	8	8
Not a Problem	5	1	0	6
Need Consistency	3	1	1	5
Marketplace Should Govern	4	0	0	4
Expenses Not Justified	4	0	0	4
State Involvement Not Needed	0	4	0	4
Lower Insurance Rates	2	1	0	3
Other	26	4	15	45
TOTALS	127	47	149	323

"Separate from building codes, some counties have instituted regulations that dictate access design, cleared areas of fire resistant vegetation buffers, minimum water availability, underground power lines, etc. in an attempt to reduce the wildfire hazard in the WUI. As far as you know, has your county enacted any such regulations?" Question 11 County.

(TABLE ON FOLLOWING PAGE)

Responses to Question 11, County

STATE AND COUNTY	YES	NO	DON'T KNOW	TOTAL
WA-Okanogan	4	1	1	6
WA-Spokane	0	7	0	7
WA-Chelan	7	0	0	7
WA-Kittitas	2	1	0	3
MI-Delta	1	5	0	6
MI-Crawford	1	5	0	6
MI-Ogemaw	0	4	2	6
CO-Jefferson	2	3	0	5
CO-Summit	7	0	0	7
CO-Boulder	1	3	1	5
CO-Chaffee	1	6	0	7
MT-Lewis & Clark	0	5	1	6
MT-Flathead	2	3	0	5
MT-Missoula	0	5	0	5
AZ-Yavapai	0	5	1	6
AZ-Gila	0	2	0	2
OR-Jackson	5	1	0	6
OR-Douglas	3	1	1	5
OR-Deschutes	4	2	0	6
FL-Charlotte	1	5	0	6
FL-Sarasota	2	1	0	3
Fl-Flagler	3	5	1	9
SD-Pennington	0	6	0	6
SD-Lawrence	4	1	2	7
SD-Custer	2	4	0	6
CA-Santa Barbara	7	1	0	8
CA-Plumas	6	0	0	6

Responses to Question 11, County (Continued)

STATE AND COUNTY	YES	NO	DON'T KNOW	TOTAL
CA-El Dorado	6	0	0	6
TX-Denton	0	1	0	1
TX-Bexar	0	5	1	6
TX-Harris	1	1	0	2
AR-Saline	0	4	0	4
AR-Pulaski	0	4	0	4
AR-Garland	0	5	0	5
UT-Utah	2	0	0	2
UT-Davis	0	4	1	5
UT-Weber	4	3	1	8
TOTALS	78	109	13	200

"Separate from building codes, some states have passed legislation that dictates access design, cleared areas, or fire resistant vegetation buffers, minimum water availability, underground power lines, etc. in an attempt to reduce the wildfire hazard in the WUI. As far as you know, has your state enacted any such legislation?" Question 11 State.

Responses to Question 11, State

STATE	YES	NO	DON'T KNOW	TOTAL
Washington	0	7	0	7
Michigan	0	4	0	4
Colorado	1	4	0	5
Montana	0	5	0	5
Arizona	0	1	0	1
Oregon	2	2	0	4
Florida	1	5	0	6
South Dakota	0	4	0	4
California	2	0	0	2
Texas	0	5	1	6
Arkansas	0	2	0	2
Utah	0	4	0	4
TOTALS	6	43	1	50

"Using a scale of 1-5, with a score of "1" being strongly in favor and a score of "5" being strongly opposed--what is your opinion of having county regulations in your county that dictate access design, cleared areas, etc. to reduce the wildfire hazard in the WUI?" Question 12a County.

(TABLE ON FOLLOWING PAGE)

Responses to Question 12a, County

STATE AND COUNTY	1*	2	3	4	5**	TOTAL
WA-Okanogan	2	2	0	1	1	6
WA-Spokane	7	1	0	0	0	8
WA-Chelan	6	1	0	0	0	7
WA-Kittitas	3	0	0	0	0	3
MI-Delta	1	1	4	0	0	6
MI-Crawford	6	0	1	1	0	6
MI-Ogemaw	0	1	4	0	1	6
CO-Jefferson	5	0	0	0	0	5
CO-Summit	5	2	0	0	0	7
CO-Boulder	3	1	1	0	0	5
CO-Chaffee	4	0	2	0	1	7
MT-Lewis & Clark	3	0	3	0	0	6
MT-Flathead	4	1	0	0	0	5
MT-Missoula	3	0	0	0	1	4
AZ-Yavapai	4	1	1	0	0	6
AZ-Gila	1	0	1	0	0	2
OR-Jackson	5	0	0	0	0	5
OR-Douglas	3	1	1	0	0	5
OR-Deschutes	6	0	0	0	0	6
FL-Charlotte	0	1	2	0	3	6
FL-Sarasota	1	0	0	0	2	3
Fl-Flagler	1	3	2	1	1	8
SD-Pennington	3	2	0	1	0	6
SD-Lawrence	5	1	0	0	0	6
SD-Custer	2	1	3	0	0	6
CA-Santa Barbara	5	2	1	0	0	8
CA-Plumas	3	1	1	0	1	6

*Strongly Favor;
**Strongly Oppose

Responses to Question 12a, County (Continued)

STATE AND COUNTY	1*	2	3	4	5**	TOTAL
CA-El Dorado	4	2	0	0	0	6
TX-Denton	1	0	0	0	0	1
TX-Bexar	3	1	1	1	0	6
TX-Harris	0	0	2	0	0	2
AR-Saline	2	0	1	0	1	4
AR-Pulaski	1	0	2	1	0	4
AR-Garland	2	1	2	0	0	5
UT-Utah	1	1	0	0	0	2
UT-Davis	1	3	1	0	0	5
UT-Weber	2	2	1	1	1	7
TOTALS	106	34	37	8	11	196
PERCENT	54	17	19	4	6	100

$\bar{X}$=1.90; Standard Deviation 1.81; Standard Error .084; Kurtosis .483

*Strongly Favor
**Strongly Oppose

"Using a scale from 1-5 with a score of '1' being strongly in favor and a score of '5' being strongly opposed, what is your opinion of new statewide legislation that dictates access design in the WUI?" Question 12a State.

Responses to Question 12a, State

STATE	1*	2	3	4	5**	TOTAL
Washington	5	1	1	0	0	7
Michigan	2	0	1	0	1	4
Colorado	1	3	0	1	0	5
Montana	2	2	1	0	0	5
Arizona	0	1	0	0	0	1
Oregon	3	1	0	0	0	4
Florida	4	1	0	1	0	6
South Dakota	1	1	2	0	0	4
California	3	1	1	1	0	6
Texas	3	1	1	1	0	6
Arkansas	1	0	0	0	1	2
Utah	1	2	1	0	0	4
TOTALS	25	13	7	3	2	50
PERCENT	50	26	14	4	4	100

$\bar{X}$=1.88; Standard Deviation 1.12; Standard Error .160; Kurtosis .880

*Strongly Favor
**Strongly Oppose

"Why do you feel that way?" Question 12b County and State.

Responses to Question 12b

RESPONSE	COUNTY	STATE	TOTAL	PERCENT
Protect Lives	43	8	51	.24
Improve Firefighting (condensation of several)	30	18	48	.23
People will Resist (condensation of several)	17	4	21	.10
Share Responsibilities	10	2	12	.06
Not a Problem	7	2	9	.04
Protect Forest	7	0	7	.03
Expensive/Difficult to Implement	5	2	7	.03
OTHER	38	15	53	.25
TOTALS	164	49	213	1.00

"Still another measure some counties have taken is to conduct educational campaigns informing property owners of the actions they can take to reduce the wildfire hazard on their property. As far as you know, has your county conducted any such educational campaigns?" Question 13 County.

Responses to Question 13 Federal, State & County

	FEDERAL	STATE	COUNTY	TOTAL
Yes	98	24	119	171
No	5	24	64	93
Don't Know	0	0	15	15
TOTALS	103	48	198	349

Responses to Question 13, County
Disaggregated by County

STATE AND COUNTY	YES	NO	DON'T KNOW	TOTAL
WA-Okanogan	3	1	3	7
WA-Spokane	6	1	0	7
WA-Chelan	4	3	0	7
WA-Kittitas	1	1	1	3
MI-Delta	0	5	0	5
MI-Crawford	3	3	0	6
MI-Ogemaw	0	5	0	5
CO-Jefferson	2	3	0	5
CO-Summit	6	0	1	7
CO-Boulder	5	0	0	5
CO-Chaffee	6	1	0	7
MT-Lewis & Clark	5	1	0	6
MT-Flathead	3	1	1	5
MT-Missoula	4	1	0	5
AZ-Yavapai	6	0	0	6
AZ-Gila	2	0	0	2
OR-Jackson	2	2	0	4
OR-Douglas	3	0	0	3
OR-Deschutes	5	0	1	6
FL-Charlotte	1	3	2	6
FL-Sarasota	1	0	2	3
Fl-Flagler	5	1	0	6
SD-Pennington	5	1	0	6
SD-Lawrence	4	1	1	6
SD-Custer	5	1	0	6
CA-Santa Barbara	7	0	0	7
CA-Plumas	5	1	0	6

Responses to Question 13, County (Continued)

STATE AND COUNTY	YES	NO	DON'T KNOW	TOTAL
CA-El Dorado	2	3	0	5
TX-Denton	1	0	0	1
TX-Bexar	3	2	1	6
TX-Harris	1	1	0	2
AR-Saline	0	1	1	2
AR-Pulaski	1	3	0	4
AR-Garland	1	2	0	3
UT-Utah	1	1	0	2
UT-Davis	0	4	1	5
UT-Weber	4	4	0	8
TOTALS	113	57	15	185

"Still another measure some states have taken is to conduct educational campaigns informing property owners of the actions they can take to reduce the wildfire hazard on their property. As far as you know, has your state conducted any such educational campaigns?" Question 13 State.

Responses to Question 13, State

STATE	YES	NO	DON'T KNOW	TOTAL
Washington	3	3	1	7
Michigan	2	2	0	4
Colorado	1	4	0	5
Montana	4	1	0	5
Arizona	0	1	0	1
Oregon	1	3	0	4
Florida	2	4	0	6
South Dakota	2	2	0	4
California	2	0	0	2
Texas	3	2	0	5
Arkansas	1	1	0	2
Utah	3	1	0	4
TOTALS	24	24	1	49
PERCENT	49	49	2	100%

"Some federal agencies are involved in educational campaigns directly informing property owners in the Wildland/Urban Interface of things they can do to reduce the wildfire hazard on their property. Which federal agency campaigns, if any, are you aware of that directly inform property owners?" Question 13 Federal.

Question 13, Federal

EDUCATION CAMPAIGN	FREQUENCY	PERCENTAGE
USDA-Forest Service	50	48.5
Nat. Fire Protection Assn.	18	17.5
USDI-Bureau of Land Mgmt.	8	07.8
All of First Three Above	20	19.4
Not Aware of Any	5	04.9
All of First Four Above	2	01.9
TOTALS	103	100.0

"Using a scale of 1-5, with a score of '1' being strongly in favor and a score of '5' being strongly opposed--what is your opinion of such a campaign in your county that informs property owners of the actions they can take to reduce the wildfire hazard on their property in the WUI?" Question 14a.

Responses to Question 14a

	FEDERAL	STATE	COUNTY	TOTAL*
Count	112	50	197	359
Mean**	1.88	1.58	1.46	1.61
Standard Deviation	1.075	.950	.792	
Standard Error	.102	.134	.056	
Kurtosis	.359	2.583	4.848	

* It is not possible to determine overall SD, SE, and K as responses to this question are different variables.
** A score of 1 = strongly favors; 5 = strongly opposed

Responses to Question 14a County

STATE AND COUNTY	STRONGLY AGREE 1	2	3	4	STRONGLY DISAGREE 5	Total
WA-Okanogan	6	1				7
WA-Spokane	5	2				7
WA-Chelan	5	1	1			7
WA-Kittitas	2	1				3
MI-Delta	2	1	2			5
MI-Crawford	5	1				6
MI-Ogemaw	2	3				5
CO-Jefferson	4	1				5
CO-Summit	6		1			7
CO-Boulder	4	1				5
CO-Chaffee	6	1				7
MT-Lewis & Clark	3	3				6
MT-Flathead	5					5
MT-Missoula	4					4
AZ-Yavapai	5	1				6
AZ-Gila	2					2
OR-Jackson	4					4
OR-Douglas	3					3
OR-Deschutes	4		1			5
FL-Charlotte	3	2	1			6
FL-Sarasota	1		2			3
Fl-Flagler	5		1		1	7
SD-Pennington	3	3				6
SD-Lawrence	4	1	1			6
SD-Custer	2	2	2			6
CA-Santa Barbara	6	1				7
CA-Plumas	5				1	6

Responses to Question 14a, County (Continued)

STATE AND COUNTY	STRONGLY AGREE 1	2	3	4	STRONGLY DISAGREE 5	Total
CA-El Dorado	3	2				5
TX-Denton	1					1
TX-Bexar	2	2	1		1	6
TX-Harris	1	1				2
AR-Saline	1		1			2
AR-Pulaski	2		2			4
AR-Garland	1	2				3
UT-Utah	1		1			2
UT-Davis	2	3				5
UT-Weber	4	2	2			8
TOTALS	124	38	19	0	3	184

"Why do you feel that way?" Question 14b.

Responses to Question 14b

RESPONSE	COUNTY	STATE	FEDERAL	TOTAL
Increase Public Awareness	54	4	18	76
Cost Effective	12	2	1	15
Better Decision Making	10	1	0	11
Modify Behavior	10	8	10	28
Share Protection w/Public	9	2	2	13
Fed. Role Secondary	0	0	13	13
Feds. Have More Resources	0	0	13	13
Reduce Need for Regulation	7	3	0	10
Protect Wildlife	5	0	0	10
Not Effective	4	5	0	9
Reduce Resistance to Regs.	5	1	1	7
Good Public Relations	3	0	3	6
Not a Problem	3	0	0	3
Not Our Responsibility	3	1	0	4
Education Before Regs.	0	2	0	2
OTHER	29	19	45	93
TOTALS	125	29	61	215

"It has been proposed that standardizing federal agency actions regarding the WUI would be a positive step in addressing the problem. As far as you know, are there now any standardized policies among federal agencies?" Question 11 Federal.

It should be noted that this question, asked of only federal officials was significantly different from the same numbered question asked of county and state officials and therefore should not be compared to the latter two.

Results To Question 11, Federal

RESPONSE		FREQUENCY	PERCENT	CUMUL. %
Yes	(1)	36	31.3	31.3
No	(5)	45	39.1	70.0
Don't Know	(8)	34	29.6	100.0
TOTAL		115	100.0%	

"Using a scale from 1-5, with a score of '1' being strongly in favor and a score of '5' being strongly opposed, what is your opinion of standardizing federal agency action regarding the WUI?" Question 12a Federal.

Results To Question 12a, Federal

RESPONSE		FREQUENCY	PERCENT	CUMUL. %
Strongly Favor	(1)	37	33.3	33.3
	(2)	24	21.6	55.0
	(3)	24	21.6	76.6
	(4)	16	14.4	91.0
Strongly Oppose	(5)	10	9.0	100.0%
TOTAL		111	100.0%	
$\bar{X}$** = 2.441; SD = 1.326; SE = .126; K = -.953.				

"Why do you feel that way?" Question 12b.

Results To Question 12b, Federal

RESPONSE	FREQUENCY	PERCENT
Consistency of Response	20	19.0
Must Be Area Specific	18	17.1
County/State Responsibility	11	10.5
Standardize Priorities	8	07.6
Need a Leader	7	06.7
Less Confusion with Standardized Policies	5	04.8
Not Just Feds Involved	4	03.8
Other Responses Not Easily Categorized	32	30.5
TOTALS	105	100.0

"Has your county instituted any other hazard mitigation measures to reduce the wildfire hazard in the WUI?" Question 15a County.

(TABLE ON FOLLOWING PAGE)

Responses to Question 15a, County

STATE AND COUNTY	YES	NO	DON'T KNOW	TOTAL
WA-Okanogan	2	2	3	3
WA-Spokane	1	5	0	6
WA-Chelan	2	3	2	7
WA-Kittitas	0	2	1	3
MI-Delta	0	4	0	4
MI-Crawford	0	5	0	5
MI-Ogemaw	0	4	1	5
CO-Jefferson	2	2	1	5
CO-Summit	5	1	1	7
CO-Boulder	1	1	1	3
CO-Chaffee	3	3	1	7
MT-Lewis & Clark	3	2	1	6
MT-Flathead	2	3	0	5
MT-Missoula	0	4	1	5
AZ-Yavapai	3	0	3	6
AZ-Gila	0	1	1	2
OR-Jackson	3	1	0	4
OR-Douglas	1	2	0	3
OR-Deschutes	1	3	2	6
FL-Charlotte	1	3	2	6
FL-Sarasota	0	3	0	3
Fl-Flagler	0	4	2	6
SD-Pennington	2	4	0	6
SD-Lawrence	2	2	1	5
SD-Custer	2	4	0	6
CA-Santa Barbara	3	1	2	6
CA-Plumas	2	4	0	6

Responses to Question 15a, County (Continued)

STATE AND COUNTY	YES	NO	DON'T KNOW	TOTAL
CA-El Dorado	3	2	0	5
TX-Denton	0	1	0	1
TX-Bexar	1	3	2	6
TX-Harris	0	2	0	2
AR-Saline	0	2	0	2
AR-Pulaski	0	4	0	4
AR-Garland	2	1	0	3
UT-Utah	0	2	0	2
UT-Davis	0	3	1	4
UT-Weber	1	4	3	8
TOTALS PERCENT	48 27%	97 55%	32 18%	177 100%

"Have there been any Wildfire Hazard Mitigation Measures initiated by your office that have affected governmental policy in the wildland/urban interface?" Question 20a State.

Responses to Question 20a, State

STATE	YES	NO	DON'T KNOW	TOTAL
Washington	2	3	2	7
Michigan	1	3	0	4
Colorado	4	1	0	5
Montana	4	0	1	5
Arizona	0	0	1	1
Oregon	3	1	0	4
Florida	4	2	0	6
South Dakota	1	1	1	3
California	1	0	0	1
Texas	0	2	3	5
Arkansas	0	2	0	2
Utah	4	0	0	4
TOTALS	24	15	8	47
PERCENT	51.1	31.9	17.0	100.0

"One criticism that has been made of wildfire Hazard Mitigation Programs has been that these programs infringe upon property owners rights to do as they please on their own private property. Have you heard this criticism in your county frequently, once in a while, or not at all?" Question 16 County.

(TABLE ON FOLLOWING PAGE)

Responses to Question 16a, County

STATE AND COUNTY	HEARD FREQUENT	ONCE IN A WHILE	NOT AT ALL	DON'T KNOW	TOTAL
WA-Okanogan	4	2	0	1	7
WA-Spokane	1	5	1	0	7
WA-Chelan	1	6	0	0	7
WA-Kittitas	3	0	0	0	3
MI-Delta	1	2	2	0	5
MI-Crawford	2	2	1	1	6
MI-Ogemaw	1	1	3	0	5
CO-Jefferson	1	3	1	0	5
CO-Summit	6	0	0	0	7
CO-Boulder	1	3	1	0	5
CO-Chaffee	2	2	3	0	7
MT-Lewis & Clark	1	5	0	0	6
MT-Flathead	3	2	0	0	5
MT-Missoula	2	2	1	0	5
AZ-Yavapai	4	2	0	0	6
AZ-Gila	2	0	0	0	2
OR-Jackson	1	2	0	0	3
OR-Douglas	2	0	1	0	3
OR-Deschutes	0	4	1	1	6
FL-Charlotte	1	2	3	0	6
FL-Sarasota	2	0	1	0	3
Fl-Flagler	3	1	3	0	7

Responses to Question 16a, County (Continued)

STATE AND COUNTY	HEARD FREQUENT	ONCE IN A WHILE	NOT AT ALL	DON'T KNOW	TOTAL
SD-Pennington	5	1	0	0	6
SD-Lawrence	2	4	0	0	6
SD-Custer	6	0	0	0	6
CA-Santa Barbara	3	4	0	0	7
CA-Plumas	3	3	0	0	6
CA-El Dorado	0	5	0	0	5
TX-Denton	0	1	0	0	1
TX-Bexar	0	2	3	1	6
TX-Harris	0	1	1	0	2
AR-Saline	0	0	2	0	2
AR-Pulaski	2	1	1	0	4
AR-Garland	3	0	0	0	3
UT-Utah	2	0	0	0	2
UT-Davis	0	3	0	1	4
UT-Weber	2	4	2	0	8
TOTALS PERCENT	72 39.3	75 41.0	31 16.9	5 02.7	183 100.0

"The defenders of Wildfire Hazard Mitigation Programs say that the programs have a number of good points. For example--Homeowners who live in wildfire hazard areas now understand the problem better and are more likely to do things that will reduce the hazard. Do you agree or disagree with this statement?" Question 17 County.

Responses to Question 17, County

STATE AND COUNTY	AGREE	DISAGREE	DON'T KNOW	TOTAL
WA-Okanogan	4	2	0	6
WA-Spokane	6	1	1	8
WA-Chelan	6	0	1	7
WA-Kittitas	2	1	0	3
MI-Delta	4	1	1	6
MI-Crawford	5	0	1	6
MI-Ogemaw	3	1	2	6
CO-Jefferson	3	1	1	5
CO-Summit	4	0	2	6
CO-Boulder	4	0	1	5
CO-Chaffee	7	0	0	7
MT-Lewis & Clark	6	0	0	6
MT-Flathead	3	1	1	5
MT-Missoula	5	0	0	5
AZ-Yavapai	4	2	0	6
AZ-Gila	2	0	0	2
OR-Jackson	5	0	0	5
OR-Douglas	4	1	0	5
OR-Deschutes	6	0	0	6
FL-Charlotte	5	0	1	6
FL-Sarasota	3	0	0	3
Fl-Flagler	2	2	3	7

Responses to Question 17, County (Continued)

STATE AND COUNTY	AGREE	DISAGREE	DON'T KNOW	TOTAL
SD-Pennington	3	3	0	6
SD-Lawrence	5	2	0	7
SD-Custer	4	2	0	6
CA-Santa Barbara	6	1	1	8
CA-Plumas	4	0	2	6
CA-El Dorado	6	0	0	6
TX-Denton	0	0	1	1
TX-Bexar	4	0	2	6
TX-Harris	1	0	1	2
AR-Saline	1	0	3	4
AR-Pulaski	2	0	2	4
AR-Garland	5	0	0	5
UT-Utah	2	0	0	2
UT-Davis	4	0	0	4
UT-Weber	6	1	1	8
TOTALS	145	22	28	195
PERCENT	74.4%	11.3%	14.4%	100.0%

"People who want to buy or build a home in the Wildland/Urban Interface are more conscious of the problem where wildfire hazard mitigation programs exist. Do you agree or disagree with this statement?" Question 18 County.

Responses to Question 18, County

STATE AND COUNTY	AGREE	DISAGREE	DON'T KNOW	TOTAL
WA-Okanogan	4	1	2	7
WA-Spokane	4	3	0	7
WA-Chelan	4	2	1	7
WA-Kittitas	2	1	0	3
MI-Delta	3	2	0	5
MI-Crawford	5	1	0	6
MI-Ogemaw	4	1	0	5
CO-Jefferson	5	0	0	5
CO-Summit	4	1	1	6
CO-Boulder	4	1	0	5
CO-Chaffee	6	1	0	7
MT-Lewis & Clark	6	0	0	6
MT-Flathead	3	1	1	5
MT-Missoula	4	1	0	5
AZ-Yavapai	4	2	0	6
AZ-Gila	1	0	1	2
OR-Jackson	3	0	0	3
OR-Douglas	1	1	1	3
OR-Deschutes	6	0	0	6
FL-Charlotte	3	1	2	6
FL-Sarasota	3	0	0	3
Fl-Flagler	2	2	3	7

Responses to Question 18, County (Continued)

STATE AND COUNTY	AGREE	DISAGREE	DON'T KNOW	TOTAL
SD-Pennington	3	3	0	6
SD-Lawrence	4	2	0	6
SD-Custer	4	2	0	6
CA-Santa Barbara	6	0	1	7
CA-Plumas	5	1	0	6
CA-El Dorado	4	1	0	5
TX-Denton	0	0	1	1
TX-Bexar	1	0	5	6
TX-Harris	0	0	2	2
AR-Saline	0	0	2	2
AR-Pulaski	1	1	2	4
AR-Garland	1	0	2	3
UT-Utah	1	1	0	2
UT-Davis	2	2	0	4
UT-Weber	6	2	0	8
TOTALS	119	37	27	183
PERCENT	65.0	20.2	14.8	100.0

"Some counties have no formal Wildfire Hazard Mitigation Program and others do. Would you say that your county has a formal program?" Question 19a County.

Responses to Question 19a, County

STATE AND COUNTY	YES	NO	DON'T KNOW	TOTAL
WA-Okanogan	1	3	2	6
WA-Spokane	0	8	0	8
WA-Chelan	2	4	1	7
WA-Kittitas	1	1	1	3
MI-Delta	2	3	0	5
MI-Crawford	1	5	0	6
MI-Ogemaw	0	4	2	6
CO-Jefferson	2	3	0	5
CO-Summit	6	0	0	6
CO-Boulder	5	0	0	5
CO-Chaffee	7	0	0	7
MT-Lewis & Clark	4	2	0	6
MT-Flathead	2	3	0	5
MT-Missoula	2	3	0	5
AZ-Yavapai	2	3	1	6
AZ-Gila	0	2	0	2
OR-Jackson	4	1	0	5
OR-Douglas	4	1	0	5
OR-Deschutes	1	3	2	6
FL-Charlotte	1	5	0	6
FL-Sarasota	0	3	0	3
Fl-Flagler	1	6	0	7

Responses to Question 19a, County (Continued)

STATE AND COUNTY	AGREE	DISAGREE	DON'T KNOW	TOTAL
SD-Pennington	3	3	0	6
SD-Lawrence	3	2	2	7
SD-Custer	1	5	0	6
CA-Santa Barbara	5	3	0	8
CA-Plumas	5	1	0	6
CA-El Dorado	4	1	0	5
TX-Denton	0	0	1	1
TX-Bexar	0	4	2	6
TX-Harris	0	1	1	2
AR-Saline	0	4	0	4
AR-Pulaski	0	4	0	4
AR-Garland	0	5	0	5
UT-Utah	1	1	0	2
UT-Davis	0	3	1	4
UT-Weber	2	4	2	8
TOTALS PERCENT	72 37.1%	105 54.1%	17 08.8%	194 100.0%

"Did your county institute a formal program on its own or was it invited to participate in a joint program with others including federal or state agencies, or other counties?" Question 19b County.

Responses to Question 19b, County

STATE AND COUNTY	COUNTY INITIATED	JOINT PROGRAM	DON'T KNOW	TOTAL
WA-Okanogan	0	1	2	3
WA-Spokane	1	0	0	1
WA-Chelan	1	2	1	4
WA-Kittitas	0	1	0	1
MI-Delta	0	2	0	2
MI-Crawford	0	1	0	1
MI-Ogemaw	0	0	1	1
CO-Jefferson	1	1	0	2
CO-Summit	4	2	0	6
CO-Boulder	2	1	2	5
CO-Chaffee	0	6	1	7
MT-Lewis & Clark	1	3	0	6
MT-Flathead	0	1	1	2
MT-Missoula	0	3	0	3
AZ-Yavapai	0	2	1	3
OR-Jackson	1	3	0	4
OR-Douglas	0	2	1	3
OR-Deschutes	0	1	0	1
FL-Charlotte	0	1	0	1
Fl-Flagler	0	2	0	2

Responses to Question 19b, County (Continued)

STATE AND COUNTY	COUNTY INITIATED	JOINT PROGRAM	DON'T KNOW	TOTAL
SD-Pennington	0	3	0	3
SD-Lawrence	0	3	1	4
SD-Custer	1	1	0	2
CA-Santa Barbara	2	2	1	5
CA-Plumas	2	2	0	4
CA-El Dorado	0	4	0	4
TX-Bexar	0	0	1	1
UT-Utah	0	0	1	1
UT-Weber	0	2	0	2
TOTALS PERCENT	16 19.5%	52 63.4%	14 17.1%	82 100.0%

"Would you categorize the formal program in your county as being **ACTIVE** or **NOT ACTIVE**?" Question 20 County.

Responses to Question 20, County

STATE AND COUNTY	ACTIVE	NOT ACTIVE	DON'T KNOW	TOTAL
WA-Okanogan	1	0	2	3
WA-Chelan	3	1	0	4
WA-Kittitas	1	0	0	1
MI-Delta	0	3	0	3
MI-Crawford	1	0	0	1
MI-Ogemaw	0	0	1	1
CO-Jefferson	2	0	0	2
CO-Summit	6	0	0	6
CO-Boulder	5	0	0	5
CO-Chaffee	7	0	0	7
MT-Lewis & Clark	4	0	0	4
MT-Flathead	2	0	0	2
MT-Missoula	2	1	0	3
AZ-Yavapai	2	0	1	3
OR-Jackson	4	0	0	4
OR-Douglas	3	1	0	4
OR-Deschutes	1	0	0	1
FL-Charlotte	1	0	0	1
Fl-Flagler	1	1	0	2

Responses to Question 20, County (Continued)

STATE AND COUNTY	COUNTY INITIATED	JOINT PROGRAM	DON'T KNOW	TOTAL
SD-Pennington	1	2	0	3
SD-Lawrence	3	1	1	5
SD-Custer	3	0	0	3
CA-Santa Barbara	5	0	0	5
CA-Plumas	2	2	0	4
CA-El Dorado	3	1	0	4
TX-Bexar	0	0	1	1
UT-Utah	1	0	0	1
UT-Weber	1	1	0	2
TOTALS	68	12	6	86
PERCENT	79.1	14.0	07.0	100.0

"There is some debate about the need for Wildfire Hazard Mitigation Plans at all. Using a scale... what is your opinion of Wildfire Hazard Mitigation Plans?" Question 21a County.

Responses to Question 21a, County

RESPONSE	FREQUENCY	PERCENT
Strongly Favor 1	100	51.8
2	51	26.4
3	32	16.6
4	6	3.1
Strongly Oppose 5	4	2.1
Total	193	100%
$\bar{X}$ 1.772; Standard Deviation .974; Variance .948; Kurtosis 1.084		

"Why do you feel that way?" Question 21b County.

Results To Question 21b, County

RESPONSE	FREQUENCY	PERCENT
Needed in This County	22	15.0
Reduce Wildfire Risk	21	14.3
To Educate People	17	11.6
Promote Public Safety	13	8.8
Protect Life and Property	12	8.2
Various Negative Responses, no Consensus	19	12.9
Other Positive Responses	24	16.3
Other Responses not Easily Categorized	18	12.2
TOTALS	147	100.0%

"Earlier, you mentioned that your county has an active Wildfire Hazard Mitigation Program. Some counties have had good experiences with Wildfire Hazard Mitigation Programs and others have had some problems. Below is a list of some of the problems counties have had with WUI programs. Please indicate whether or not your county has ever had that problem with its Wildfire Hazard Mitigation Program: If YES, how serious was that problem." Question 22 County.

Question 22, County

Has a problem with a Wildfire Mitigation Program in this county ever been that...				How serious has each problem ever been in this county--Very Serious, Somewhat Serious, Not Serious?			
	YES	NO	DK	VS	SWS	NS	DK
Property values in the WUI have fallen?	3	47	22	0	0	27	15
Ongoing development projects abandoned?	4	55	10	3	2	30	10
Incomplete and Inaccurate zone maps?	20	32	17	2	17	26	6
Homeowners have not been willing to participate?	34	21	12	7	28	13	7
Program administration is a burden to county?	21	37	10	2	19	14	11
Interagency confusion has hindered implementation?	14	47	8	8	4	31	6
Homeowners have complained about the plan?	29	26	14	4	14	22	11
Many appeals and requests for variances made?	17	35	16	1	15	20	13
TOTALS	142	300	109	27	99	183	79

"Aside from the problems we have just discussed, have there been any other problems with the Wildfire Hazard Mitigation Program in your county?" Question 23a County.

"What were these problems?" Question 23b County.

Results To Question 23b, County

RESPONSE	FREQUENCY	PERCENT
Lack of Funding	7	35.0
Interest has Declined	5	25.0
Lack of Homeowner Cooperation	3	15.0
Other Responses Not Easily Categorized	5	25.0
TOTALS	20	100%

"In your opinion, does the Wildfire Hazard Mitigation Program in your county appear to be very fair, somewhat fair, somewhat unfair, or very unfair to each of the following groups?" Question 24 County.

Question 24, County

IS YOUR WILDFIRE HAZARD MITIGATION PLAN FAIR TO THE FOLLOWING?	VERY FAIR	SOME WHAT FAIR	SOME WHAT UNFAIR	VERY UNFAIR	DON'T KNOW
Homeowners who live in the WUI areas	45	23	1	0	1
Persons who own undeveloped land in WUI	34	27	5	1	3
Commercial recreation areas	38	23	0	0	6
Subdivision developers in the WUI	32	26	5	1	3
County officials who administer the plan	33	23	5	1	4

"Counties differ in how local regulations are proposed, enacted, or turned down. We are interested in what happens in your county with proposals for Wildfire Hazard Mitigation Measures. Below is a list of persons and groups that sometimes get involved in such matters at the county level. Looking at each of the persons or groups on the list, please indicate whether each is active and favors; active and opposes; or is not active in county wildfire hazard legislation or regulation." Question 26a County.

Responses to Question 26a, County

PERSON OR GROUP	ACTIVE FAVORS	ACTIVE OPPOSES	NOT ACTIVE	DON'T KNOW
Chief Executive	54	2	51	37
Civil Defense Director	10	41	52	67
County Commission	96	8	44	23
County Planning Department	113	2	32	23
Local Real Estate Board	10	20	67	77
National Inholders Assn.	3	2	40	8
Major Land Developers	10	41	52	67
Construction Firms	16	23	63	68
Local Newspapers	70	0	41	59
Chamber of Commerce	30	4	60	75
Roofing Industry	18	22	50	80
Local TV and Radio	52	0	42	74
Conservation Groups	67	3	34	67
Fire Departments	143	1	8	20
People With WUI Homes	33	17	49	64
Your Agency	120	1	32	14
Individuals	33	20	42	69
You	127	2	33	6

"States differ in how legislation and regulations are proposed and enacted or turned down. We are interested in what happens in your state with proposals or measures that would affect wildfire hazard mitigation. Below is a list of persons and groups that sometimes get involved in WUI matters at the state level. Please indicate whether each is active and favors; active and opposes; or is inactive in state wildfire hazard mitigation legislation or regulation." Question 25a State.

Responses to Question 25a, State

PERSON OR GROUP	ACTIVE FAVORS	ACTIVE OPPOSES	NOT ACTIVE	DON'T KNOW
Governor	9	0	28	12
Indiv. St. Representatives	15	1	17	12
Indiv. St. Senators	12	4	16	14
Civil Defense Director	22	0	14	14
USDA Forest Service	39	0	5	5
USDI Bureau of Land Mgmt.	16	0	16	15
State Planning Agency	10	1	15	21
Conservation Groups	4	1	23	21
Local Officials	21	2	13	8
State Fire Fighters ASSN.	34	0	5	10
National Inholders ASSN.	0	0	8	38
Insurance Firms	2	3	26	17
Homeowners	15	2	15	14
St. Emergency Mgmt. Agency	32	0	8	12
State Forestry Agency	48	0	0	1
Wood Products Industry	16	1	14	17
Nat'l Fire Protection ASSN	37	0	4	8
You	46	0	4	0

"People working within federal agencies are motivated to favor or oppose an issue for various reasons. Below is a list of persons and groups that sometimes get involved in WUI matters. Please indicate whether each is active and favors; active and opposes; or inactive on the issue of wildfire at the Wildland/Urban Interface." Question 21 Federal.

Responses to Question 21, Federal

PERSON OR GROUP	ACTIVE FAVORS	ACTIVE OPPOSES	NOT ACTIVE	DON'T KNOW
Your agency	92	0	3	8
USDA Forest Service	107	0	2	3
USDI Bureau of Land Mgmt.	52	0	15	42
Fed. Emergency Mgmt. Agency	43	1	6	60
State DNR/Forestry Agency	98	0	4	9
State Planning Agency	26	1	16	67
State Emergency Mgmt.	32	1	14	63
Cnty. Emergency Mgmt.	48	1	24	37
County Firefighters	89	1	6	14
County Commission	46	2	30	32
Conservation Groups	16	4	35	54
Red Cross	22	1	19	67
Wood Products Industry	25	4	35	44
Homeowners	35	8	35	29
You	103	2	4	1

"A measure that some states have instituted to control development has been the creation of a state land use oversight agency. This agency makes suggestions to local land use planning agencies and reserves final judgement on the appropriateness of plans produced at the local level. As far as you know, has your state created such a land use oversight agency?" Question 15 State.

Responses to Question 15, State

STATE	YES	NO	DON'T KNOW	TOTAL
Washington	4	3	0	7
Michigan	0	3	1	4
Colorado	1	4	0	5
Montana	0	5	0	5
Arizona	0	1	0	1
Oregon	4	0	0	4
Florida	4	1	0	5
South Dakota	0	4	0	4
California	1	0	1	2
Texas	0	3	3	6
Arkansas	0	2	0	2
Utah	1	2	1	4
TOTALS	15	28	6	49
PERCENT	30.6	57.1	12.2	100%

"Using a scale from 1-5, with a score of '1' being strongly in favor and a score of '5' being strongly opposed, what is your opinion of the creation of a state land use oversight agency in your state?" Question 16a State.

Responses to Question 16a, State

RESPONSE	FREQUENCY	PERCENT
Strongly Favor 1	6	12.8
2	8	17.0
3	12	25.5
4	13	27.7
Strongly Oppose 5	8	17.0
Total	47	100%
$\bar{X}$ 3.191; Standard Deviation 1.279; Variance 1.636; Kurtosis -.934		

"Why do you feel this way?" Question 16b State.

Results To Question 16b, State

RESPONSE	FREQUENCY	PERCENT
Don't Need Another Agency	11	26.8
Local Problem	9	22.0
Improves County Planning	9	22.0
Infringement upon Private Property Rights	4	09.8
Other Responses Not Easily Categorized	8	19.5
TOTALS	41	100%

"In some states a special excise tax has been levied on property in wildfire susceptible areas to help pay the cost of fire-fighting in those areas. As far as you know has your state instituted such a tax?" Question 17a State.

Responses to Question 17a, State

STATE	YES	NO	DON'T KNOW	TOTAL
Washington	4	2	0	6
Michigan	0	4	0	4
Colorado	1	4	0	5
Montana	2	3	0	5
Arizona	0	1	0	1
Oregon	4	0	0	4
Florida	2	3	0	5
South Dakota	0	4	0	4
California	0	2	0	2
Texas	0	4	1	5
Arkansas	1	1	0	2
Utah	0	4	0	4
TOTALS	14	32	1	47
PERCENT	29.8	68.1	02.1	100%

"Using a scale...what is your opinion of the levying of a special state excise tax to help pay the cost of fire-fighting in the WUI in your state?" Question 18a State.

Responses to Question 18a, State

RESPONSE	FREQUENCY	PERCENT
Strongly Favor 1	16	33.3
2	12	25.0
3	9	18.8
4	6	12.5
Strongly Oppose 5	5	10.4
TOTAL	48	100%
$\bar{X}$ 2.417; Standard Deviation 1.350; Variance 1.823; Kurtosis .674		

"Why do you feel that way?" Question 18b.

Results To Question 18-b, State

RESPONSE	FREQUENCY	PERCENT
WUI Users Should Pay	17	37.0
Other Techniques Better	8	17.4
State Population Should Pay	5	10.9
Already Done Here	4	8.7
Politically Unacceptable	4	8.7
Other Responses Not Easily Categorized	8	17.4
TOTAL	46	100%

"There are various roles that can be occupied by state [federal] agencies in wildfire hazard mitigation at the WUI. Thinking of all of the land involved in the problem, do you feel that the proper role for a state [federal] is as a lead agency; as a member of a joint program with federal [state] and local agencies; in a support role; or should not be involved in the issue at all." Question 19 State: Question 15 Federal.

Responses to Question 19 State; Question 15 Federal

PROGRAM TYPE	STATE	FEDERAL	TOTAL
Member Agency; Joint Program	17[•] 14.9[••] 37.0[•••]	97 85.1 86.6	114 72.2%
Lead Agency/Joint Program	29 65.9 63.0	15 34.1 13.4	44 27.8%
Independent Program	0 0	0 0	0 0
Noninvolvement	0 0	0 0	0 0
Don't Know	1 2.1	0 0	0 0
TOTAL	47 100%	112 100%	158 100%
Pearson's χ^2 Sig. F = .00000; DF = 1; Missing = 9;			

[•] Cell Count
[••] Row Percent
[•••] Column Percent

"Are there specific individuals who are 'shakers and movers' on the issue of wildfire at the Wildland/Urban Interface?" Question 26b County: Question 25 State: Question 24G Federal.

When asked this question, 158 (73%) individuals responded "Yes" while 59 (27%) respond "No". Almost 3/4 of the individuals (recall that a similar percentage reported being

actively involved in this issue) were aware of someone who is more than just involved, but is aggressively pushing this issue as important. There is no significant difference in the responses from county and state employees on this issue.

> "Let's assume that you favor Wildfire Hazard Mitigation Measures in your [jurisdiction]. Listed below are some factors that could hinder the adoption of such measures. Based on a scale of 1-5 with a score of '1' indicating that a factor is very important and a score of '5' indicating that a factor is not important, please indicate how important a factor would be in hindering adoption of Wildfire Hazard Mitigation Measures." Question 27 County: Question 26 State: Question 22 Federal.

Responses to Question 27 County, 26 State, 22 Federal

FACTOR THAT HINDERS ADOPTION OF MITIGATION MEASURES	MEAN ALL RESPONSE	MEAN FED.	MEAN STATE	MEAN CNTY.	ANOVA SIG. F
Lack of Funding	1.58*	1.50	1.42	1.66	.142
Lack of Interest Among Property Owners	2.00	1.74	1.82	2.21	.000
Lack of Interest Among Politicians	2.19	2.03	1.92	2.36	.008
Pre-Existing Laws and Regs.	2.67	2.42	2.42	2.89	.002
Interagency Conflicts	2.72	2.61	2.92	2.74	.420
County Intra-Agency Conflicts	2.76	2.46	2.78	2.94	.016
State Intra-Agency Conflicts	2.91	2.76	3.16	2.93	.213
Fed. Intra-Agency Conflicts	3.18	3.20	3.45	3.09	.240
AVERAGE TOTAL MEANS	2.50	2.34	2.49	2.60	

*Score of "1" = Very Important; Score of "5" = Not at all Important

> "In the long run, say over the next twenty years, how much effect do you think Wildfire Hazard Mitigation Measures will have on development and construction in the Wildland/Urban Interface areas in your jurisdiction? Please use the scale below, with a score of '1' indicating a very strong effect and a score of '5' indicating no effect at all." Question 28a County; Question 21a State; Question 17a Federal.

With an overall $\bar{X}$ of 2.51 (Federal=2.68, State=2.60, County=2.38); Sig. F=.051; F=2.994; DF=2; and DF residual =349), this was regarded as a problem, but not a "very serious one". An SNK procedure indicated no significance differences between groups. However, manipulating numbers slightly produced a significantly different picture between county and both federal and state. It is obvious when looking at the results subjectively, that county respondents found this to be a more significant problem than either their state or federal counterparts. With a $\bar{X}$ of 2.23, this group was the most concerned about impacts in the next twenty years.

"Why do you feel that way about the effect on development?" Question 28b County.

Results To Question 28-b County

RESPONSE	FREQUENCY	PERCENT
Mitigation Measures Will Prove To Be a Worthwhile Approach	27	18
Homeowners Will Resist Change	20	14
Improved Safety in WUI	18	12
More WUI Construction	11	7
Slow WUI Construction	11	7
Not a Problem	9	6
Other Responses Not Easily Categorized	51	35
TOTALS	147	100

"Some argue that families and businesses know the risks they are taking when they build or live in the Wildland /Urban Interface. Since people undertake these risks willingly, then it is their responsibility to bear the losses they might suffer when wildfire occurs. According to this view, government agencies should not consider protection of buildings in the WUI a problem to be addressed. Using a scale of 1-5, with a score of '1' indicating strong agreement and a score of '5' indicating strong disagreement, how do you stand on the above statement?" (There are two paragraphs of introduction for this question and the two following. See Appendix # 1 for the first paragraph.) Question 29 County, Question 22 State, Question 18 Federal.

"Still another controversial viewpoint is that government agencies should develop stricter land use controls and building standards to reduce risks from wildfire at the Wildland/Urban Interface. According to this view, in the most wildfire prone areas, the government should prohibit development. In less wildfire prone areas, the government should require that homesites and businesses be wildfire resistant. The argument is that government agen-

cies require these kinds of measures rather than spending money to fight structure fires and aid in reconstruction. [Use the same rating scale as above]. Question 30 County, Question 23 State, Question 19 Federal.

"A third view is that the government should make compulsory some form of wildfire insurance by requiring insurance coverage on all homes in wildfire hazard areas. Government agencies would then no longer pursue the development of Wildfire Hazard Mitigation Programs, relying instead on insurance companies to establish wildfire resistant criteria and pricing insurance accordingly." [Use the same rating scale as above]. Question 31 County, Question 24 State, Question 20 Federal.

Responses to Question 29-31 County, 26-28 State, 22-24 Federal

SCENARIO FOR DEALING WITH THE WUI PROBLEM	MEAN ALL RESPONSE	MEAN FED.	MEAN STATE	MEAN CNTY.	ANOVA SIG.F
WUI Property Owners Should Bear the Losses Themselves	N=355 3.76*	n=114 3.71	n=49 4.49	n=192 3.59	.000
Government Should Heavily Regulate Construction	N=355 2.61	n=115 2.40	n=49 2.80	n=191 2.69	.114
Government Should Require WUI Insurance and then butt out	N=354 3.54	n=114 3.35	n=49 3.59	n=191 3.63	.158
AVERAGE TOTAL MEANS	3.30	3.15	3.63	3.30	

*Score of "1" = Very Important; Score of "5" = Not at all Important

"Do you now, or have you ever lived in a home that you felt was vulnerable to wildfire?" Question 32a County; Question 27a State; Question 23a Federal.

Responses to Question 32a County, 27a State, 23a Federal

RESPONSE	FEDERAL	STATE	COUNTY	TOTAL
Yes	69* 42** 61***	18 11 38	79 48 43	166 48%
No	45 25 40	29 16 62	104 58 57%	178 52%
TOTALS	114	47	183	344
Pearson's χ^2 Significant F = .00490; DF = 2; DF residual = 344; Missing = 27;				

* Cell Count
** Row Percent
*** Column Percent

"What is the exact title of your position?" Question 33a County, Question 28a State, Question 24a Federal.

Results To Question 33a County

POSITION TITLE	FREQUENCY	PERCENT
County Commissioner	53	27.2
Fire Marshal-Fire Chief	29	14.4
County Planning Commissioner	26	13.3
EMS Administrator	19	9.7
County Administrator	19	9.7
Planning Administrator	16	8.2
Fire Department Administrator	11	5.6
Sheriff's Office	4	2.1
Resource Manager	4	2.1
Engineer	4	2.1
County Engineering Administration	2	1.0
Other	8	4.1
TOTALS	195	100%

Results To Question 28a State

POSITION TITLE	FREQUENCY	PERCENT
District or Area Forester	13	26.5
Fire Prevention Person	7	14.3
District Manager	5	10.2
Assistant Regional Manager	4	8.2
Fire Management Specialist	3	6.1
County Forester	2	4.1
Assistant District Forester	2	4.1
Unit Manager	2	4.1
Chief or Assistant Chief, Fire Control	2	4.1
Fire Marshal-Fire Chief	1	2.0
Fire Control Forester	1	2.0
Assistant Area Manager	1	2.0
Fire Division Supervisor	1	2.0
Coop Fire Protection	1	2.0
Division Staff	1	2.0
Staff Forester	1	2.0
Fire Training and Prevention	1	2.0
Assistant State Forester	1	2.0
TOTALS	49	100%

Results To Question 24a Federal

POSITION TITLE	FREQUENCY	PERCENT
Fire Management Officer	44	38.9
District Forest Ranger	41	36.3
Fire/Fuels Management Officer	4	3.5
Forest Tech Timber/Fire	3	2.7
Asst Ranger Timber/Fire	3	2.7
Forest Fire Dispatch	3	2.7
Fire Prevention Specialist	2	1.8
Suppression Forest Tech	2	1.8
Supervisory Forester	2	1.8
District Fire Manager	1	0.9
USFS Staff Officer	1	0.9
USFS Assistant Fire Staff	1	0.9
Wildlife Biologist	1	0.9
Timber/Fire Staff Officer	1	0.9
Zone Fire Manager	1	0.9
Assistant Forest Fire Staff	1	0.9
Fire Control Officer	1	0.9
Forester	1	0.9
TOTALS	117	100%

"How many years have you held this position?" Question 33b County, Question 28b State, Question 24b Federal.

Responses to Question 33b County, 28b State, 24b Federal

YEARS IN POSITION	FEDERAL	STATE	COUNTY	TOTAL
1-5 Years	49 * 27.8 - 43.8 --	18 10.2 37.5	109 61.9 55.6	176 49.4%
6-10 Years	28 31.8 25.0	11 12.5 22.9	49 55.7 25.0	88 24.7%
11-15 Years	20 33.9 17.9	12 20.3 25.0	27 45.8 13.8	59 16.6%
16-20 Years	7 38.9 6.3	5 27.8 10.4	6 33.3 3.1	18 5.1%
Over 20 Years	8 53.3 7.1	2 13.3 4.2	5 33.3 2.6	15 4.2%
TOTALS	112	48	196	356

* Cell Count
\- Row Percent
-- Column Percent

Results of Question 33b County, 28b State, 24b Federal

JURISDICTION	FREQUENCY	MEAN
Federal	113	8.47
State	49	8.71
County	196	6.37
TOTAL	358	7.35

ANOVA Sig. F = .003; F= 5.926; DF = 2; DF residual = 355; Missing = 11

"Is this position elected, appointed, or civil service?" Question 33d County, Question 28d State, Question 24c Federal.

Responses to Question 33d County, 28d State, 24c Federal

POSITION TYPE	FEDERAL	STATE	COUNTY	TOTAL
Elected	0 ▪ 00.0 ▬ 00.0 ▬▬	0 00.0 00.0	74 100.0 21.1	74 21.1%
Appointed	2 2.0 18.0	5 4.9 10.9	95 93.1 49.2	102 29.1%
Civil Service	110 62.9 98.2	41 23.4 89.1	24 13.7 12.4	175 49.9%
TOTALS	112	46	193	351
Pearson's χ^2 Significant F = .0000; DF = 4; DF residual = 347; Missing = 18;				

▪ Cell Count
▬ Row Percent
▬▬ Column Percent

Results of Question 33b County, 28b State, 24b Federal
compared to
Results of Question 33d County, 28d State, 24d Federal

POSITION TYPE	FREQUENCY	MEAN YEARS IN CURRENT POSITION
Elected	74	4.92
Appointed	100	7.98
Civil Service	174	8.09
TOTAL	348	7.38
ANOVA Sig. F = .000; F= 8.273; DF = 2; DF residual = 345; Missing = 21		

"What do you actually do in this job? (i.e. what are some of your main duties?" Question 33c County, Question 28c State, Question 24d Federal.

Results To Question 33c County, 28c State, 24d Federal

MAJOR JOB DUTIES	FREQUENCY	PERCENT
County Respondents		
County Planning	85	26.5
Fire Administration	35	10.9
County Administration	18	5.6
Emergency Service Policy	18	5.6
Sheriff's Department	3	0.9
State Respondents		
Fire Management	24	7.5
Resource Management	21	6.5
Federal Respondents		
Fire Management	57	17.8
Ranger District Administrators	29	9.0
Resource Management	24	7.5
Other (from all three levels)	7	2.2
TOTALS	321	100%

"What percent of your time do you allocate to problems associated with the Wildland/Urban Interface?" Question 33e County, Question 28f State, Question 24e Federal.

Results of Question 33e County, 28f State, 24e Federal

JURISDICTION	FREQUENCY	MEAN % OF TIME ON WUI ISSUES
Federal	114	17.92
State	49	45.84
County	188	11.60
TOTAL	351	18.43
ANOVA Sig. F = .000; F= 26.785; DF = 2; DF residual = 348; Missing = 18		

"What is the area of your jurisdiction?" Question 33f County, Question 28f State, Question 24f Federal:

Results of Question 33f County, 28e State, 24g Federal

JURISDICTION	FREQUENCY	PERCENT OF TOTAL SAME JURISDICTION
Federal Responses		
Ranger District/ Resource Area	85	76.6
National Forest/ BLM District	24	21.6
Less than 1 RD	1	0.9
Half of a State	1	0.9
State Responses		
Entire State	9	21.4
4 Counties	9	21.4
2 Counties	4	9.5
3 Counties	4	9.5
5 Counties	4	9.5
1 County	3	7.1
Half the State	2	4.8
6 Counties	2	4.8
13 Counties	2	4.8
Half a County	1	2.4
8 Counties	1	2.4
10 Counties	1	2.4
County Responses		
100% of County	137	82.5
Other County	29	17.5%
$\bar{X}$ All County Responses = 88.9% of one county		

"Not including the position you already told me about, have you ever held any of the following positions? Question 34 County, Question 29 State, Question 25 Federal.

Responses to Question 34 County, 29 State, 25 Federal

POSITION HELD		FEDERAL	STATE	COUNTY	TOTAL
ELECTED OFFICE	YES	6	8	58	72
	NO	105	41	125	271
Pearson's χ^2 Significant F = .0000; DF = 2; DF residual = 341; Missing = 26;					
Appointed Dept. Head	YES	7	5	53	65
	NO	102	43	131	276
Pearson's χ^2 Significant F = .0000; DF = 2; DF residual = 339; Missing = 28;					
Elected Civic Org. Officer	YES	35	21	106	162
	NO	75	26	85	186
Pearson's χ^2 Significant F = .0003; DF = 2; DF residual = 346; Missing = 21;					
Elected Trade Union Officer	YES	0	3	18	21
	NO	109	44	169	322
Pearson's χ^2 Significant F = .0004; DF = 2; DF residual = 341; Missing = 26;					
Elected Bus. Assn. Officer	YES	32	21	98	151
	NO	77	27	88	192
Pearson's χ^2 Significant F = .0005; DF = 2; DF residual = 341; Missing = 26;					
Elected Cons. Org. Officer	YES	11	7	20	38
	NO	99	41	168	346
Pearson's χ^2 Significant F = .6811; DF = 2; DF residual = 344; Missing = 23;					

"Looking back over your entire work experience and job history, what would you say has been your major or predominant job or occupation? Question 35 County: Question 30 State: Question 26 Federal.

Results To Question 35 County

MAJOR JOB OR OCCUPATION DURING ENTIRE CAREER	FREQUENCY	PERCENT W/IN GROUP
County Respondents		
Fire Administration/Control	32	17.8
Planning/Building Admin.	18	10.0
Public Administration	17	9.4
Self-Employed	12	6.7
Emergency Management	10	5.6
Law Enforcement	10	5.6
Building Industry	10	5.6
Natural Resource Mgmt.	9	5.0
Military	6	3.3
Education and Training	5	2.8
Engineer	5	2.8
Forest Management	5	2.8
Management (Private)	3	1.7
Mining	2	1.1
Others reported by only one individual	36	20.0
TOTALS	180	100%

Question 30 State

MAJOR JOB OR OCCUPATION DURING ENTIRE CAREER	FREQUENCY	PERCENT W/IN GROUP
State Respondents		
Forest Management	12	26.7
Fire Management	10	22.2
Resource Management	8	17.8
Fire Suppression	7	15.6
Planning/Building Department	1	2.2
Manager	1	2.2
Personnel & Program Director	1	2.2
Tech Information Assistant	1	2.2
Administrative/Supervisor	1	2.2
Public Education	1	2.2
Other	2	4.4
TOTALS	45	100%

Results of Question 26 Federal

MAJOR JOB OR OCCUPATION DURING ENTIRE CAREER	FREQUENCY	PERCENT W/IN GROUP
Federal Respondents		
Fire Management	39	35.5
Forest Management	28	25.5
Resource Management	14	12.7
Fire Suppression	12	10.9
Wildlife Biologist	4	3.6
District Ranger	3	2.7
Rangeland Management	2	1.8
Federal Land Management	2	1.8
Education and Training	1	0.9
Soil Scientist	1	0.9
Recreation, Fire Management	1	0.9
Other	3	2.7
TOTALS	45	100%

"In what year were you born?" Question 36 County: Question 31 State: Question 26 Federal.

Responses to Question 36 County, 31 State, 26 Federal

JURISDICTION	FREQUENCY	YEAR OF BIRTH
Federal	111	1947.69
State	47	1947.85
County	185	1943.53
TOTAL	343	1945.47

ANOVA analysis of variance. Sig. F = 000; F = 9.372; DF = 2; DF residual = 341; Missing = 26

Responses to Question 36 County, 31 State, 26 Federal

AGE OF RESPONDENTS	FEDERAL	STATE	COUNTY	TOTAL
Less Than 36 Years Old	10* / 35.7= / 8.8==	4 / 14.3 / 8.2	14 / 50.0 / 7.5	28 / 8.0%
36-45 Years Old	48 / 36.1 / 42.5	23 / 17.3 / 46.9	62 / 46.6 / 33.3	133 / 38.2%
46-55 Years Old	47 / 37.6 / 41.6	17 / 13.6 / 34.7	61 / 48.8 / 32.8	125 / 35.9%
56-65 Years Old	8 / 16.7 / 07.1	5 / 10.4 / 10.2	35 / 72.9 / 18.8	48 / 13.8%
Over 65 Years Old	0 / 0 / 0	0 / 0 / 0	14 / 100.0 / 7.5	14 / 4.0%
TOTALS	113	49	186	348

Pearson's χ^2 Significant F = .0022;
DF = 8; DF residual = 340; Missing = 21;

* Cell Count
= Row Percent
== Column Percent

Descriptive Statistics for Year of Birth

DESCRIPTIVE STATISTICS	FEDERAL	STATE	COUNTY	TOTAL
Mean	47.62*	48.02	43.43	45.55
Mode	48	47	50	43
Median	48	48	45	47
Variance	52.95	44.48	107.27	80.90
St. Deviation	7.28	6.67	10.36	8.99
Range	41	27	61	61
Skewness	.572	-.219	-.597	-.432
Kurtosis	1.171	-.700	.437	.560

*Year of Birth, e.g. 47.62 = 1947 + .62 years

"What is the highest degree or diploma you presently hold?" Question 37 County, Question 32 State, Question 27 Federal.

Responses to Question 37 County, 32 State, 27 Federal

EDUCATION LEVEL	FEDERAL	STATE	COUNTY	TOTAL
Less Than H. S.	0* 0- 0--	1 33.3 2.0	2 66.7 1.0	3 8.0%
High School	21 27.6 18.3	5 6.6 10.2	50 65.8 26.3	76 21.5%
AA Degree	12 27.9 10.4	3 7.0 6.1	26 65.1 14.7	43 12.1%
BA or BS Degree	67 39.4 58.3	37 21.8 75.5	66 38.8 34.7	170 48.0%
MA or MS Degree	14 25.5 12.2	3 5.5 6.1	38 69.1 20.0	55 15.5%
PhD Degree	1 100.0 9.0	0 0 0	0 0 0	1 0.3%
Law Degree	0 0 0	0 0 0	6 100.0 3.2	6 1.7%
TOTALS	115	49	190	354

Pearson's χ^2 Significant F = .0001;
DF = 6; DF residual = 348; Missing = 15. (These statistics are calculated on a table with < H.S. added to H.S. and PhD and Law added to MA or MS Degree.)

* Cell Count
\- Row Percent
\-- Column Percent

"If you have had any other training that you feel is pertinent to the issue of wildfire at the Wildland/Urban Interface, please briefly describe the training."
Question 38 County, Question 33 State, Question 28 Federal.

One hundred and sixty-seven individuals (45%) responded identifying further training: 71 county (42.5% of the total responders and 35% of county individual respondents); 23 state (14% of total responders and 46% of state respondents); 50 federal (30% of the total responders and 44% of

federal respondents). The majority of the training listed is fire related.

"How many years have you lived in your state of residence?" Question 39 County, Question 34 State, Question 29 Federal.

Responses to Question 39 County, 34 State, 29 Federal

JURISDICTION	FREQUENCY	YEARS OF STATE RESIDENCE
Federal	111	21.68
State	47	30.04
County	185	33.42
TOTAL	343	29.16
ANOVA analysis of variance. Sig. F = 000; F = 16.845; DF = 2; DF residual = 350; Missing = 16		

Responses to Question 39 County, 34 State, 29 Federal

YEARS OF RESIDENCE IN THIS STATE	FEDERAL	STATE	COUNTY	TOTAL
Less than 10 Years	37* 67.3= 32.5==	3 5.0 6.4	15 27.3 7.8	55 15.6%
10 Thru 19 Years	28 37.8 24.6	12 16.2 25.5	34 45.9 17.7	74 2.1%
20 Thru 29 Years	12 24.0 10.5	7 14.0 14.9	31 62.0 16.1	50 14.2%
30 Thru 39 Years	11 22.0 9.6	9 18.0 19.1	30 60.0 15.6	50 13.8%
40 Thru 49 Years	19 24.4 16.	10 12.8 21.3	49 62.8 25.5	78 22.1%
50 Thru 59 Years	7 20.0 6.1	6 17.1 12.8	22 62.9 11.5	35 9.0%
60 Thru 77 Years	0 0 0	0 0 0	11 100.0 5.7	11 3.1%
TOTALS	114	47	192	353

Pearson's χ^2 Significant F = .0000;
DF = 12; DF residual = 341; Missing = 16;

* Cell Count
= Row Percent
== Column Percent

Descriptive Statistics for Length of State Residency

DESCRIPTIVE STATISTICS	FEDERAL	STATE	COUNTY	TOTAL
Mean*	21.52	30.04	33.12	28.96
Mode	3 or 12	15	40	20
Median	15	32	35.5	14
Variance	299.17	149.47	294.32	313.04
St. Deviation	17.30	15.10	17.16	17.69
Range	57	53	76	76
Skewness	.517	.085	.057	.160
Kurtosis	-1.20	-1.28	-.92	-1.08

*Years

"How many years have you lived in this county?" Question 40 County, Question 35 State, Question 30 Federal.

Responses to Question 40 County, 35 State, 30 Federal

JURISDICTION	FREQUENCY	YEARS OF CNTY RESIDENCE
Federal	111	10.30
State	47	17.04
County	185	24.61
TOTAL	343	18.94

ANOVA analysis of variance. Sig. F = 000; F = 34.424; DF = 2; DF residual = 340; Missing = 26

Responses to Question 40 County, 35 State, 30 Federal

YEARS OF RESIDENCE IN THIS COUNTY	FEDERAL	STATE	COUNTY	TOTAL
Less than 10 Years	67* 59.3= 59.3==	14 12.4 29.8	32 28.3 16.6	113 3.2%
10 Thru 19 Years	31 29.5 27.4	15 14.3 31.9	59 56.2 30.6	105 29.7
20 Thru 29 Years	9 16.1 8.0	7 12.5 14.9	40 71.4 20.7	56 15.9
30 Thru 39 Years	3 10.7 2.7	6 21.4 12.8	19 67.9 9.8	28 7.9
40 Thru 49 Years	1 3.0 0.9	4 15.4 8.5	21 80.8 10.9	26 7.4
50 Thru 59 Years	2 12.5 1.8	0 0 0	14 87.5 7.3	16 4.5
60 Thru 77 Years	0 0 0	0 0 0	8 100.0 4.1	8 2.3
TOTALS	113	47	193	353

Pearson's χ^2 Significant F = .0000;
DF = 14; DF residual = 339; Missing = 16;

* Cell Count
= Row Percent
== Column Percent

Descriptive Statistics for Length of County Residency

DESCRIPTIVE STATISTICS	FEDERAL	STATE	COUNTY	TOTAL
Mean*	10.26	17.41	24.49	19.00
Mode	4	3	20	20
Median	7	14.5	20	14
Variance	92.89	146.20	286.10	246.41
St. Deviation	9.64	12.09	16.91	15.70
Range	50	43	76	76
Skewness	2.14	.877	.884	1.22
Kurtosis	5.57	-.167	-.070	.868

*Years

APPENDIX 3
EXAMPLES OF WILDLAND/URBAN INTERFACE PUBLICATIONS

Included below are listed some of the myriad publications that have been produced by various agencies involved in the the issue of wildfire at the wildland/urban interfacae. They have been subdivided into federal, state, county, and interagency publications.

The federal government is involved through the Federal Emergency Management Agency (FEMA); the National Fire Protection Association (NFPA); the USDA Forest Service; the USDI Bureau of Land Management and other agencies within the USDI. Below is a partial listing of pertinent publications and video tapes available from the federal government, most aimed at lower levels of government, but some aimed directly at property owners in the interface.

National Fire Academy and FEMA 1989, "Wildland/Urban Interface Fire Protection Training Kit" which includes a workbook, a textbook, and a 46 minute video tape.

FEMA 1990, Post-Disaster Hazard Mitigation Planning Guidance for State and Local Governments. This book encourages state and local governments to rebuild in post-disaster settings in such a manner as to make the are less vulnerable to another disaster. The book also explains how FEMA is involved; the statutes FEMA operates under, and the regulations promulgated by FEMA to implement those statutes and what state and local governments must do to receive federal aid. This is one of the simplest sources available explaining the relationship between the different levels of government and just a little reading between the lines provides a look into how it works in reality.

NFPA ND, Building Interagency Cooperation; A Six-Step Process to Help You Improve Your Fire Protection Effectiveness. This 28 page guide is aimed at fire fighters at all levels.

NFPA ND, Fire Fighter Safety in Wildland/Urban Interface Fires. This 24 page guide is intended to make wildland fire fighter more aware of the special hazards involved in fighting fires at the interface.

National Wildfire/Urban Fire Protection Conference and NFPA 1987, Wildfire Strikes Home. This 89 page publication covers the entire spectrum of the problems associated with wildfire at the wildland/urban interface from a fire fighter's perspective. It is not clear who the audience for this book is, but I believe that it was meant to be read by administrators and politicians as well as ordinary folks.

NFPA 1991, Wildfire Strikes Home, Second Edition. Updated and expanded version of the 1987 publication above.

NFPA ND, Black Tiger Fire. This "case study of the wildland/urban interface fire that destroyed 44 homes and other structures near Boulder, Colorado, July 9, 1989" is a slick publication appears to be geared toward a general audience including public officials and private citizens.

NFPA 1991, Stephan Bridge Road Fire. Similar to the study above, this equally slick publication is a case study of the fire May 8, 1990 where 76 homes, 125 other structures, 37 vehicles, 5916 acres were burned. It also appears to have been written from a fire fighter's perspective and aimed at an audience of public officials and private citizens.

National Wildfire Coordinating Group and NFPA 1989, Wildland /Urban Interface Reference Materials. This publication is a thorough review of information on the interface including books, articles, brochures, periodicals, and audiovisual resources.

There are several other NFPA publications. In addition the NFPA is listed as a supporting agency in many of the publications on the wildfire at the wildland/urban interface issue that are published by other federal and state agencies.

The USDA Forest Service is the second federal agency heavily involved in the publishing and dissemination of informational documents on wildfire at the wildland/urban interface. Nearly 100% of the publications that are available on the issue have the Forest Service listed either as an author or as a supporting agency. Below is a sampling of the kinds of publications that the Forest Service published directly.

Gale, Robert D. and Hanna J. Cortner (both USDA Forest Service employees), 1987. People and Fire at the Wildland Urban Interface, a Sourcebook. This is the proceedings of a workshop held in 1986 in Ashville, North Carolina, one of the few conferences held that involved researchers from the social side of the issue.

Fischer, William C. and Stephen F. Arno (both USDA Forest Service employees), 1988. Protecting People and Homes From Wildfire in the Interior West: Proceedings of the Symposium and Workshop. This proceedings is the most thorough coverage of the issue to date. Many good papers were presented.

USDA Forest Service, 1990. A Strategic Plan for the 90's: Working Together for Rural America. A general guide for development in rural areas.

USDA Forest Service, 1979. A Self-Help Method for Solving Fire Problems. A self-directed guide for fire fighting in rural settings.

Radtke, Klaus W. H. (USDA Forest Service employee), 1983. Living More Safely in the Chaparral-Urban Interface. Guide directed toward people living in the chaparral region of California.

USDA Forest Service, 1990. Smokey's "It Could Happen To You" Coloring Book. This coloring book directed toward children demonstrates the depth the USDA Forest Service is involved in the issue.

USDA Forest Service, ND. Protecting Your Home From Wildfire. Simple guide for homeowners to reduce the fire hazard around their rural homes. There are many publications of this sort supported by the USDA Forest Service, either directly or in conjunction with state agencies.

Abt, R. C. et al., 1990. A Case Study of Wildfire Mitigation Strategies in Wildland/Urban Development. An example of the research on the issue that the USDA Forest Service supports directly.

The thoroughness of Los Angeles County in addressing the problem is demonstrated by the array of publications available on the issue of wildfire at the wildland/interface. Clearly this is considered to be a major problem in the county. However, it must be remembered that Los Angeles County has plenty of people living in highly fire-adapted chaparral ecosystems.

Los Angeles County Department of Forester and Fire Warden. 1989a. "Fire Hazard VS. Erosion Control; A Homeowners Guide." Los Angeles: Los Angeles County.

Los Angeles County Flood Control District. NDa. "Homeowner's Guide For Debris and Erosion Control." Los Angeles: Los Angeles County.

Los Angeles County Fire Department. NDb. "How to Landscape for Safer Hillside Living; and Fire Safety and Erosion Control; They are Compatible." Los Angeles: Los Angeles County.

Los Angeles County. NDc. "Special Building and Occupancy Requirements for Group R Occupancies."

The following publications are good examples of the kind of work that is being done within the auspices of interagency organizations.

Adams, G. L. 1990. Defensible Space: The Problem of the 90's, In the Wildland Urban-Intermix, Unpublished manuscript.

Arizona State Land Department, Doney Park Fire Department,Timber line-Fernwood Fire Department, USDA Forest Service and Cocopai Resource Conservation and Development. 1988. A wildland/Urban Interface Fire Protection Plan for the Cinder Hills Interface Protection Area, Flagstaff Arizona. Flagstaff: Arizona State Land Department.

Porter Nancy, Project Coordinator. 1990. Project Analysis of the Foothills Wildland/Urban Interface: A Rural Community Cooperative Program, Foothills Wildland/Urban Interface Project. Missoula.

[The] Sierra Front Wildfire Cooperators. 1990. Wildfire Protection: A guide for homeowners and developers. Washington D.C.: U.S. Government Printing Office.

[The] Sierra Front Wildfire Cooperators. ND. "Sierra Front History and Philosophy." Unpublished internal manuscript.

[The] Tahoe Landscape. June 1990. "Tahoe's Wildfire Threat; Four Factors Contributing to Wildfire Threat; Readers Ask "What Permits for Tree Removal From Private Property"; If a Wildfire Approaches; Backyard Wildfire Hazards; Be Prepared for Firebrands; Plants for the Lake Tahoe Basin." The Tahoe Landscape, (Vol. II, No. 2):1-4.

Los Angeles County Department of Forester and Fire Warden. 1989b. "Vegetation Management in the Wildland-Urban Interface of Los Angeles County." Los Angeles: Los Angeles County.

Los Angeles County Fire Department and USDA Forest Service. 1990. "Homeowners Guide to Fire and Watershed Safety at the Chaparral/Urban Interface." Los Angeles: Los Angeles County.

Los Angeles County Fire Department, C. R. Section. 1982. "How To Protect Your Home From Brush Fires; Suggestions for Increasing Your Fire Safety." Los Angeles: Los Angeles County.

Los Angeles County Fire Department, F. D. NDd. "Safeguarding Your Home Against Wildland Fire." Los Angeles: Los Angeles County.

A sampling of state publications and videos is included here. State involvement as measured by publications varies widely.

Massachusetts, University of Cooperative Extension Service 1989. Wildland Fire Awareness in Your Community. Produced cooperatively by Connecticut, Massachusetts, Rhode Island, and the USDA Forest Service. Simple 8 page brochure.

Northwest Interagency Fire Prevention Group 1988. Planning for Survival, How to Protect Your Home From Wildfire. This eighteen page guide is supported and disseminated by four federal agencies (USDA Forest Service, USDI BLM, USDI BIA, USDI NPS, Washington DNR, and Oregon DOF, as well as the Central Oregon Fire Prevention Cooperative representing three Central Oregon Counties. The guide is very concise and informative to property owners, visitors to forested areas, and potential property owners. Over 28,000 of these guides have been distributed.

Northwest Interagency Fire Prevention Group 1978. Fire Safety Considerations for Developments in Forested Areas. Companion guide to the preceding, directed to homebuilders and developers.

Coulter, J. Bruce ND, Wildfire Safety Guidelines For Rural Homeowners. One of a series of guides put out by the Colorado State Forest Service. This one is directed toward homeowners.

Zeleny, Ronald J. 1988. Wildfire Safety: Model Regulations for Protecting People and Homes From Wildfire in Subdivisions and Developments. Second in the series by the Colorado State Forest Service. Also directed toward developers.

Colorado State Forest Service ND, Guide to Thinning. Guide explaining to small property owners the benefits to thinning forest trees on their property.

Colorado State Forest Service 1990. State of Colorado Wildfire Hazard Mitigation Plan. An example of a hazard mitigation plan as required by FEMA for a state to be eligible for federal funds in the event of a wildfire-caused disaster.

Rural Fire Advisory Council 1988. Wildfire Strikes Home in Texas.This publication and the one following are both based upon conferences and clearly indicate the framework offered by the federal government for states to couch their involvement in. both publications are almost alike in every way.

Louisiana Department of Agriculture and Forestry 1989. Wildfire Strikes Home in Louisiana.

Washington State Department of Natural Resources 1989. "Wildfire Hits Home." This 15 minute video is intended to visually explain the interface problem to both citizens and involved politicians and administrators.

There are abundant brochures, pamphlets, guides and videos produced at the state level. The above selection is merely a representation of the kinds of things agencies are doing.

REFERENCES

Abt, R. C., D. Kelley and M. Kuypers. 1987. "The Florida Palm Coast Fire: An Analysis of Fire Incidence and Residence Characteristics." Fire Technology. 23(3):186-197.

Abt, R. C., M. Kuypers and J. B. Whitson. July 1990. A Case Study of Wildfire Mitigation Strategies in Wildland/Urban Development. Unpublished manuscript.

Adams, G. L. 1990. Defensible Space: The Problem of the 90's, In the Wildland Urban-Intermix. Unpublished manuscript.

Adams, G. and E. Smith. June 1990. "What is 'Defensible Space'?" The Tahoe Landscape. 2(2):3.

Alberta Forestry, Lands and Wildlife and Forest Service. NDa. Wildfire: Beware and Prepare. Edmonton: Alberta Forestry, Lands and Wildlife; Forest Service.

Alberta Forestry Lands and Wildlife and Forest Service. NDb. Forest Fire Management in Alberta. Forest Protection Branch. Edmonton: Alberta Forestry, Lands, and Wildlife; Forest Service.

Alberta Forestry, Lands and Wildlife and Forest Service. NDc. Wildfire: Beware and Prepare. Edmonton: Alberta Forestry, Lands and Wildlife; Forest Service.

Alberta Forestry Lands and Wildlife and Forest Service. NDd. Protect Your Forest Home From Fire. Edmonton: Alberta Forestry, Lands, and Wildlife; Forest Service.

Alesch, D. J. and W. J. Petak 1986. The Politics and Economics of Earthquake Hazard Mitigation. Boulder: Institute of Behavioral Science.

Alesch, D. J. and W. J. Petak. 1988. "Earthquake Hazard Mitigation in Long Beach and Los Angeles." IN Crisis Management; A Casebook, M. T. Charles and J. C. K. Kim (ed.) Springfield, IL: Charles C. Thomas.

Arizona State Land Department, Doney Park Fire Department, Timberline-Fernwood Fire Department, USDA Forest Service and Cocopai Resource Conservation and Development. 1988. A Wildland/Urban Interface Fire Protection Plan for the Cinder Hills Interface Protection Area, Flagstaff Arizona. Flagstaff: Arizona State Land Department.

Audet, M. 1988. "Insurance for Liability Arising out of Technological and Environmental Risks." IN Risk Assessment and Management: Emergency Planning Perspectives: L. R. G. Martin. 273-295. Waterloo: University of Waterloo Press.

Australian Mutual Provident Society. 1984. Survival: An Australian Manual for Combating Natural Disasters. New South Wales: Australian Mutual Provident Society.

Bartlett, G. S., P. S. Houts, L. K. Byrnes and R. W. Miller. 1983. "The Near Disaster at Three Mile Island." International Journal of Mass Emergencies and Disasters. 1:19-42.

Bertness, J. E. 1986. Hazard Perception Research: A Critique and Proposal. Urbana: University of Illinois at Urbana-Champaign.

Bradshaw, T. D. 1987. "The Intrusion of Human Population Into Forest and Range Lands of California." IN Davis, J. B. and R. E. Martin. Proceedings of the Symposium on Wildland Fire 2000. South Lake Tahoe, CA. April 27-30, 1987. General Technical Report PSW-101. Berkeley, CA. Pacific Southwest Forest and Range Experiment Station, Forest Service, U.S. Department of Agriculture.

Burton, I. and R. W. Kates. 1974. "The perception of Natural Hazards in Resource Management." IN Human Behavior and the Environment: Interactions Between Man and His Physical World. J. H. Sims and D. D. Baumann (eds.). 80-107. Chicago: Maaroufa Press.

Burton, I., R. W. Kates, and G. F. White. 1978. The Environment as Hazard. New York: Oxford University Press.

Bush Fire Council of New South Wales. NDa. Everyone's Guide to Rural Homesite Selection and Layout. Sydney: Bush Fire Council of New South Wales.

Bush Fire Council of New South Wales. NDb. Everyone's Guide to House Design and Modification in Bushfire Prone Areas. Sydney: Bush Fire Council of New South Wales.

Bush Fire Council of New South Wales. NDc. Everyone's Guide to Choosing an Urban Bushland Homesite. Sydney: Bush Fire Council of New South Wales.

California Department of Forestry and Fire Protection, USDA Forest Service, R. 5. and CSU Chico & Cal Poly Pomona. 1988. Fire Safe California Workshops: Survival by Design. (Rough draft circulated for comments).

Carpenter, E. H., J. G. Taylor, H. J. Cortner, P. D. Gardner, M. J. Zwolinski and T. C. Daniel. Spring 1986. "Targeting Audiences and Content for Forest Fire Information Programs." Journal of Environmental Education. 17d:33-41.

Cirincione, P. November 26, 1990. Letter to Steve Cook.

Cohen, M. D., J. G. March and J. P. Olsen. 1972. "A Garbage Can Model of Organizational Choice." Administrative Science Quarterly. 17(1):1-25.

Colorado State Forest Service, Colorado State University and Coulter, J. B. ND. Landowner Guide to Thinning. Boulder: Colorado State Forest Service.

Colorado State Forest Service. July 1990. Wildfire Hazard Mitigation Plan. Boulder:Colorado State Forest Service.

Cook, S. 1989a. "Wildfire at the Urban Interface in Florida: The Results of a Residential Survey." Paper presented in Natural Hazards course, University of Florida.

Cook, S. 1989b. "Environmental Perceptions of Forest Fire Hazards: A Comparison of Two Sample Populations." Research project as partial requirement for Ph.D. Gainesville: University of Florida.

Corona Fire Department. ND. Corona Fire Department Fuel Modification Program. Corona, CA:Corona Fire Department.

Cortner, H. J., M. J. Zwolinski, E. H. Carpenter and J. G. Taylor. 1984. "Public Support for Fire-Management Policies." Journal of Forestry. 82:359-361.

Cortner, H. J., R. M. Swinford and M. R. Williams. 1990. "Wildland/Urban Interface Emergency Responses: What Influences Them?" Fire Management Notes 51(4):3-8.

Cortner, H. J. and T. Lorensen. ND Resources or Structures: Fire Suppression Priorities in the Wildland Urban Interface. Unpublished paper.

Coulter, J. B. 1980. Wildfire Safety Guidelines for Rural Homeowners. Boulder: Colorado State Forest Service.

Dannenberg, M. R. 1983. Fire Protection in the Wildland/Urban Interface: A Montana Viewpoint. University of Montana, School of Forestry. Unpublished Masters thesis.

Davis, J. B. 1987. "Assessing subjective preferences for future fire research." IN Davis, J. B. and R. E. Martin. Proceedings of the Symposium on Wildland Fire 2000. South Lake Tahoe, CA. April 27-30, 1987. General Technical Report PSW-101. Berkeley, CA: Pacific Southwest Forest and Range Experiment Station, Forest Service, U. S. Department of Agriculture.

Davis, James B. 1989. "Demography: A Tool for Understanding the Wildland/Urban Interface Fire Problem." IN Berg, Neil H., Technical Coordinator. Proceedings of the Symposium on Fire and Watershed Management; October 26-28, 1988; Sacramento, CA: General Technical Report PSW-109. Berkeley, CA: Pacific Southwest Forest and Range Experiment Station, Forest Service, U.S. Department of Agriculture. 38-42.

Davis, J. B. 1990. "The Wildland Urban Interface: Paradise or Battleground?" Journal of Forestry 88(1):26-31.

Diggs, D. M. (Editor). 1988. Risk Communication, Lessons From Natural Hazards: An Annotated Bibliography: Topical Bibliography #15. Boulder: University of Colorado; Natural Hazards Research and Applications Information Center.

Dillman, D. A. 1978. Mail and Telephone Survey Research. New York: John Wiley and Sons.

Drabek, T. E. 1986. Human System Responses to Disaster: An Inventory of Sociological Findings. New York: Springer - Verlag.

Earthquake Engineering Research Institute. 1986. Reducing Earthquake Hazards: Lessons Learned from Earthquakes. El Cerrito, CA: Earthquake Engineering Research Institute.

Eulau, H. 1969. Micro-Macro Political Analysis: Accents of Inquiry. Chicago: Aldine.

Federal Emergency Management Agency. September 1990. Post-Disaster Hazard Mitigation Planning Guidance For State and Local Governments. Washington DC: FEMA.

Fire Management in Alberta. 1990. "Fire Management in the Wildland/Urban Interface of Alberta, Canada." Wildfire News & Notes. 4(1):14.

Fischer, W. C. and S. F. Arno. 1988. IN W. C. Fischer and S. F. Arno. Protecting People and Homes From Wildfire in the Interior West: Proceedings of the Symposium and Workshop. Missoula, Montana, October 6-8, 1987. General Technical Report 251. Ogden, UT: Intermountain Research Station, Forest Service, U.S. Department of Agriculture.

Florida Department of Agriculture and Consumer Affairs, Division of Forestry. 1987. Florida Wildland/Urban Fire Protection Initiative. Orlando, FL: September 15-16.

Forrester, J. W. 1971. "Counterintuitive Behavior of Social Systems." Theory and Decision 2:109.

Fowles, H. A., compiler. 1965. Silvics of Forest Trees of the United States. Washington DC: U.S. Department of Agriculture; Agriculture Handbook # 271.

Fowlkes, M. R. and P. Y. Miller. 1988. "Unnatural Disaster at Love Canal." IN Chrisis Management: A Casebook, M. T. Charles and J. C. K. Kim (eds.): 23-42. Springfield, IL: Charles C. Thomas.

Gale, R. D. and Cortner, H. J. 1987. People and Fire at the Wildland/Urban Interface: A Sourcebook. Washington DC: USDA, Forest Service.

Gardner, P. D., H. Cortner and J. A. Bridges. July/August 1985. "Wildfire: Managing the Hazard in Urbanizing Areas." Journal of Soil and Water Conservation 4:318-321.

Gardner, P. D., H. J. Cortner and K. F. Widaman. 1987. "The Risk Perceptions and Policy Response Toward Wildland and Fire Hazards by Urban Homeowners." Landscape and Urban Planning 14:65-68.

Geisler, C. C. 1979. A Sociological Interpretation of Land Use Planning in Capitalist Society. University of Wisconsin-Madison, Department of Sociology-Rural. Unpublished Ph.D. dissertation, 1979.

Godschalk, D. R. 1985a. Hazard Mitigation Through Development Management. Chapel Hill, NC: Center For Urban and Regional Studies.

Godschalk, D. R. 1985b. Linking Hazard Mitigation and Coastal Development Management: A Model Future Strategy. Chapel Hill, NC: Center For Urban and Regional Studies.

Godschalk, D. R., Brower, and T. Beatley. 1989. Catastrophic Coastal Storms: Hazard Mitigation and Development Management. Durham, NC: Duke University Press.

Golde, R. A. 1976. Muddling Through: The Art of Properly Unbusinesslike Management. New York: AMACOM.

Groves, G. R. Sept. 1988. "County Land Use Planning, How Can Planners Help the Fire Services in Protecting Homes from Wildfire." IN Protecting People and Homes from Wildfire in the Interior West, W. C. Fischer and S. F. Arno (eds.) Missoula, Oct. 6-8, 1987. General Technical Report 251. Ogden, UT. Intermountain Research Station, Forest Service, U. S. Department of Agriculture.

Hewitt, K. 1983. "The Idea of Calamity in a Technocratic Age." IN Interpretations of Calamity, K. Hewitt (ed.): 3-32. Winchester, Mass: Allen & Unwin.

Hohenemser, C. and O. Renn. 1988. "Chernobly's Other Legacy: Shifting Public Perceptions of Nuclear Risk." Environment 30(3):5-11; 40-45.

Irwin, R. L. 1987. Local Planning considerations for the wildland-structural intermix in the year 2000. GTR PSW-101. Berkeley: USDA Forest Service, PSW Forest and Range Experiment Station.

Irwin, R. L. 1989. A Discussion of the County General Plan and the Role of Strategic Fire Protection Planning: Sacremento: California Department of Forestry and Fire Protection; September 30.

Kates, R. W. 1962. Hazard and Choice Perception in Floodplain Management. Chicago: University of Chicago Press.

Kates, R. W. 1971. "Natural Hazard in Human Ecological Perspective: Hypotheses and Models." Economic Geography 47:438-451.

Kates, R. W. and Burton, I. 1986. Geography, Resources, and Environment; Volume 1; Selected Writings of Gilbert F. White. Chicago: The University of Chicago Press.

Kingdon, J. W. 1984. Agendas, Alternatives, and Public Policies. Boston: Little, Brown.

Kraske, J. 1988. "Fire Prevention Plans Mitigate Wildland/ Urban Interface Dangers." Wildfire Strikes Home! 2(5): 4-6.

Kraske, J. December 13, 1990. Letter to Steve Cook.

Lindblom, C. E. 1959. "The Science of Muddling Through." Public Administration Review: 14:79-88.

Los Angeles County. NDc. Special Building and Occupancy Requirements for Group R Occupancies.

Los Angeles County Department of Forester and Fire Warden. 1989a. Fire Hazard VS. Erosion Control; A Homeowners Guide. Los Angeles: Los Angeles County.

Los Angeles County Department of Forester and Fire Warden. 1989b. Vegetation Management in the Wildland-Urban Interface of Los Angeles County. Los Angeles: Los Angeles County.

Los Angeles County Fire Department, C. R. Section. 1982. How To Protect Your Home From Brush Fires; Suggestions for Increasing Your Fire Safety. Los Angeles: Los Angeles County.

Los Angeles County Fire Department. NDa. How to Landscape for Safer Hillside Living; and Fire Safety and Erosion Control; They are Compatible. Los Angeles: Los Angeles County.

Los Angeles County Fire Department. NDb. Safeguarding Your Home Against Wildland Fire. Los Angeles: Los Angeles County.

Los Angeles County Fire Department and USDA Forest Service. 1990. Homeowners Guide to Fire and Watershed Safety at the Chaparral/Urban Interface. Los Angeles: Los Angeles County.

Los Angeles County Flood Control District. NDe. Homeowner's Guide For Debris and Erosion Control. Los Angeles: Los Angeles County.

Louisiana Department of Agriculture and Forestry. October 25-27, 1989. Wildfire Strikes Home in Louisiana. Baton Rouge: Louisiana Department of Agriculture and Forestry.

March, J. G. and J. P. Olsen. 1976. Ambiguity and Choice in Organizations. Oslo: Universitetsforlaget.

Massachusetts, University of, Cooperative Extension. Wildland Fire Awareness in Your Community. Amherst, Massachusetts: USDA University of Massachusetts Cooperative Extension.

May, F., State Hazard Mitigation Planner (Utah Division of Comprehensive Emergency Management). 1990. Wasatch Mountain Fire: Hazard Mitigation Plan, Interim Report. Salt Lake: Utah Division of Comprehensive Emergency Management; September.

Mitchell, J. K. 1974. "Natural Hazards Research." IN I. R. Manners and M. W. Mikesell. Perspectives on Environment. Washington, DC: Association of American Geographers.

Mittler, E. 1988. "Agenda-setting in Nonstructural Hazard Mitigation Policy." IN Managing Disaster: Strategies and Policy Perspectives, L. K. Comfort (ed.): 87-107. Durham: Duke University Press.

Moore, H. E. 1981. Protecting Residences from Wildfires: A Guide for Homeowners, Lawmakers, and Planners. Berkeley, CA: General Technical Report PSW-50, Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture.

National Fire Academy and Federal Emergency Management Agency. 1989 (approx). Wildland/Urban Interface Fire Protection: Training Kit. Washington DC: FEMA.

National Fire Protection Association. ND. Protecting Your Home From Wildfire. Quincy, MA: National Fire Protection Association.

National Fire Protection Association. ND. Black Tiger Fire Case Study. Quincy, MA: Fire Investigations Division, National Fire Protection Association.

National Fire Protection Association. 1991a. Stephan Bridge Road Fire. Quincy, MA: NFPA.

National Fire Protection Association. 1991b. Wildfire Strikes Home! Second Edition. Quincy, MA: NFPA.

National Fire Protection Association and USDAFS/USDI/NASF. 1988 (approx). Fire Fighter Safety in the Wildland/Urban Interface Fires. Quincy, MA: National Fire Protection Association.

National Fire Protection Association, USDAFS, USDI, NASF and USFA. 1988 (approx). Building Interagency Cooperation. Quincy, MA: National Fire Protection Association.

National Wildfire Coordinating Group. 1989. Wildland/Urban Interface Reference Materials. Washington DC: National Wildfire Coordinating Group.

National Wildland/Urban Fire Protection Conference. 1987. Wildfire Strikes Home!. Washington DC: USDA Forest Service; National Fire Protection Association; United States Fire Administration.

Northwest Interagency Fire Prevention Group, Bureau of Indian Affairs, Bureau of Land Management, Oregon State Department of Forestry, USDA Forest Service and Washington State Department of Natural Resources. January. Fire Safety Considerations for Developers in Forested Areas. Lacey, WA: Washington State Department of Natural Resources.

Northwest Interagency Fire Prevention Group, Bureau of Indian Affairs, Bureau of Land Management, Oregon State Department of Forestry, USDA Forest Service, National Park Service and Washington Department of Natural Resources. 1988. Planning for Survival: How to Protect Your Home From Wildfire. Lacey, WA: Washington State Department of Natural Resources.

Nyland, E. 1977. "International Teamwork Applied to Fire Protection Planning in the Yukon." Forest Fire News.

Oregon, State of. 1988. An Action Plan For Protecting Rural/Forest Land From Wildfire: Wildfire Planning Task Force: Salem OR: Department of Forestry, Department of Land Conservation and Development, Emergency Management Division, Office of State Fire Marshal; November.

Oregon Department of Forestry. March 1, 1990. "Oregon Administrative Rules 660, Division 6."

Oregon's Awbrey Hall Fire. 1991. "Oregon's Awbrey Hall Fire." Wildfire News and Notes 5(3): 8.

O'Shea, K. 1991. "Wildfire in the Wildland/Urban Interface." Wildfire News & Notes 5(1):12.

Palm, R. I. 1990. An Integrative Theory for Natural Hazards Research. Baltimore MD: Johns Hopkins Press.

Perry, D. G. November 13, 1990a. Letter to Steve Cook.

Perry, D. G. 1990b. "Worst-Ever W/U Interface Fire in California Takes 648 Structures." Wildfire News & Notes 4(4):1.

Petak, W. J. and A. A. Atkisson. 1982. Natural Hazard Risk Assessment and Public Policy: Anticipating the Unexpected. New York NY: Springer Verlag.

Porter Nancy, Project Coordinator. 1990. Project Analysis of the Foothills Wildland/Urban Interface: A Rural Community Cooperative Program. Missoula MT: Missoula County Fire Protection Association.

Quarantelli, E. L. 1977. "Some Basic Themes in Sociological Studies of Disasters." IN Disasters: Theory and Research E. L. Quarantelli (ed.): 1-14. Beverly Hills CA: Sage Publications.

Quarantelli, E. L. 1987. "Criteria Which Could be Used in Assessing Disaster Preparedness Planning and Managing." Paper presented at the International Research and Training Seminar on Regional Development Planning for Disaster Prevention. October 13-23. Tokyo.

Radtke, K. W. H. 1983. Living More Safely in the Chaparral-Urban Interface. Berkeley, CA: General Technical Report PSW-67, Pacific Southwest Forest and Range Experiment Station, Forest Service, U.S. Department of Agriculture.

Rice, C. L. and Davis, J. B. 1991. Land-Use Planning May Reduce Fire Damage in the Urban-Wildland Intermix. Berkeley, CA: General Technical Report PSW-127, Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture.

Rossi, P. H., J. D. Wright. and E. Weber-Burdin. 1982. Natural Hazards and Public Choice. The State and Local Politics of Hazard Mitigation. New York NY: Academic Press.

Rossi, P. H., J. D. Wright, and A. B. Anderson. 1983. Handbook of Survey Research. Orlando FL: Academic Press.

Rural Fire Advisory Council, Texas Forest Service and USDA Forest Service. December 1988. Wildfire Strikes Home in Texas. College Station TX: Texas Forest Service.

Saarinen, T. F. 1976. Environmental Planning--Perception and Behavior Boston MA: Houghton Mifflin Company.

Santa Barbara News-Press. July 2, 1990. "A Special Report on the Painted Cave Fire." Special Report.

Santa Barbara County Fire Department. ND. How To Protect Your Home When Wildfires Threaten." Santa Barbara: Santa Barbara County.

Schneider, S. K. 1990. "FEMA, Federalism, Hugo, and 'Frisco." Publius: The Journal of Federalism 20:97-115.

Shrivastava, P. 1987. Bhopal: Anatomy of a Chrisis. Cambridge MA: Balinger Publishing Co.

Sierra Front Wildfire Cooperators. 1990. Wildfire Protection: A guide for homeowners and developers. Washington D.C.: U. S. Government Printing Office.

Sierra Front Wildfire Cooperators. ND. Sierra Front History and Philosophy. Washington D C: U.S. Government Printing Office.

Slovic, P., B. Fischhoff and S. Lichtenstein. 1980. "Facts and Fears: Understanding Perceived Risk." IN Societal Risk Assessment: How Safe is Safe Enough?, R. C. Schwing and W. A., Jr. Albers (eds.) :181-214. New York NY: Plenum Press.

Sorenson, J. D. 1983. "Knowing How to Behave Under the Threat of Disaster: Can It Be Explained." Environment and Behavior. 15:438-457.

Successful Interface in Montana. 1991. "Successful Interface for the Foothills of Ninemile, Montana." Wildfire News & Notes. 5(1):13.

Tahoe's Wildfire Threat. June 1990. "Tahoe's Wildfire Threat; Four Factors Contributing to Wildfire Threat; Readers Ask "What Permits for Tree Removal From Private Property"; If a Wildfire Approaches; Backyard Wildfire Hazards; Be Prepared for Firebrands; Plants for the Lake Tahoe Basin." The Tahoe Landscape 2(2):1-4.

Taylor, J. G. and T. C. Daniel. 1984. "Prescribed Fire: Public Education and Perception." Journal of Forestry 82:361-365.

Tokle, Gary; Heilman, Ed., Workshop Leader (Senior Fire Specialist, NFPA). 1988. "Using Wildland Residential Standards, Laws, and Regulations for Protection Now and In the Future." IN Protecting People and Homes from Wildfire in the Interior West; Oct. 6-8, 1987, Fischer, W. C.; Arno, S. F., Compilers. Missoula. Ogden: 68-70.

USDA Forest Service. 1979. A Self-Help Method for Solving Fire Problems. Miscellaneous Publication Number 1377. Washington DC: USDA Forest Service.

USDA Forest Service and Bureau of Land Management. 1989. Smokey's "It Could Happen to You" Activity Book. Washington DC: USDA Forest Service.

USDA Forest Service. 1990. A Strategic Plan for the 90's: Working Together for Rural America. Washington DC: USDA Forest Service.

USDA Forest Service. ND. Protecting Your Home From Wildfire. Washington DC: USDA Forest Service.

USDA Forest Service, NFPA, Forestry Canada, USDI, La Secretaria de Agricultura y Rrecursos Hidraulicos de Mexico, USAID and NASF. 1989. International Wildland Fire Conference. Boston, MA: July 23-26.

Viereck, L. A. and Little, E. L. Jr. 1972. Alaska Trees and Shrubs. Agriculture Handbook # 410. Washington DC: USDA Forest Service.

Walt, H. R. 1989. "Current and Future Wildland Fire Protection Impacts of the Wildland-Urban Interface." IN Proceedings of the Symposium on Fire and Watershed Management, N. H. Berg (ed.): 3-7. Berkeley, CA. General Technical Report PSW-109, Pacific Southwest Research Station, Forest Service, U. S. Department of Agriculture.

Washington Department of Natural Resources. 1989 Wildfire Hits Home. Olympia WA: Washington Department of Natural Resources.

Washington State Department of Natural Resources, Washington Fire Commissioners Association and Washington State Association of Fire Chiefs/USDA Forest Service. 1990. Statewide Wildfire Conference. Olympia WA: Washington State Department of Natural Resources.

Watts, M. 1986. "Drought, Environment and Food Security: Some Reflections on Peasants, Pastoralists and Commoditization in Dryland West Africa." IN Drought and Hunger in Africa: Denying Famine a Future, M. H. Glantz (ed.): 171-211. Cambridge: Cambridge University Press.

White, G. F. 1945. Human Adjustment to Floods: A Geographical Approach to the Flood Problem in the United States. Research Paper no. 29. Chicago IL: University of Chicago.

White, G. F. 1958. Changes in Urban Occupancy of Floodplains. Chicago IL: University of Chicago Press.

White, G. F. 1961. Papers on Flood Problems. Chicago IL: University of Chicago Press.

White, G. F. 1964. Choice of Adjustments to Floods. Chicago: University of Chicago Press.

White, G. F. 1974. "Natural Hazards Research: Concepts, Methods, and Policy Implications." IN Natural Hazards, Local, National, Global, G. F. White (ed.): 3-16. New York NY: Oxford University Press.

Wildavsky, A. 1988. Searching for Safety. New Brunswick and London: Transaction Books.

Zeleny, R. J. 1988. Wildfire Safety: Model Regulations for Protecting People and Homes From Wildfire in Subdivisions and Developments. Boulder: Colorado State Forest Service.

BIOGRAPHICAL SKETCH

I was born and raised in North Central Washington where I first attended college at Wenatchee Valley College. I became an adult in Fairbanks, Alaska, where I attended the University of Alaska, obtaining a Bachelor of Science and a Master of Science degrees. Years later I attended the University of Florida, obtaining this Ph.D. in 1995.

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

César N. Caviedes, Chairman
Professor of Geography

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Stephen M. Golant
Professor of Geography

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Timothy J. Fik
Associate Professor of Geography

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Douglas R. Carter
Assistant Professor of Forest
Resources and Conservation

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

William F. Keegan
Associate Professor of Anthropology

This dissertation was submitted to the Graduate Faculty of the Department of Geography in the College of Liberal Arts and Sciences and to the Graduate School and was accepted as partial fulfillment of the requirements for the degree of Doctor of Philosophy.

May 1995

Dean, Graduate School

LD
1780
1995
.C771